

DOT 614

REPORT NOS. 212-CAL-84-120

301-CAL-84-120

NHTSA NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 212 AND 301-75

CHRYSLER CORPORATION
1984 DODGE DAYTONA
2-DOOR HATCHBACK

NHTSA NO. CE0301
CALSPAN TEST NO. 7209-12

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FINAL REPORT

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16. Abstract A frontal load cell barrier test of a 1984 Dodge Daytona 2-door hatchback was performed at Calspan Corporation, Advanced Technology Center, Transportation Research/Physical Sciences Department facility, for the New Car Assessment and Standards Enforcement Testing of FMVSS 212, "Windshield Mounting" and 301-75, "Fuel System Integrity" for the Office of Vehicle Safety Compliance, the Office of Market Incentives (OMI) and for Research and Development. Impact speed was 35.4 mph. Ambient temperature on the test data was 20°F. The post-test vehicle crush was 24.3 inches and intrusion of the firewall into compartment was 9.0 inches. The test vehicle appeared to comply with the following vehicle performance standards: FMVSS 212 - Windshield Retention FMVSS 301-75 - Fuel System Integrity With regard to occupant restraint performance (FMVSS 208 Injury Criteria), both the driver and passenger position Part 572 test devices satisfied the criteria.					
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SECTION 1
PURPOSE AND TEST PROCEDURE

This frontal barrier test is part of the Composite FY 83 Vehicle Barrier Impact Testing, sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract DTNH22-82-C-01140. The purpose of this test was to obtain crashworthiness and occupant restraint performance data for impact speeds in excess of the current FMVSS requirements.

The test was performed in accordance with the Office of Automotive Ratings Laboratory Procedure No. IP-212-02 dated April 4, 1980. Indicant test data for FMVSS 212, "Windshield Mounting," and FMVSS 301-75, "Fuel System Integrity," as well as occupant performance data for a nominally 35 mph impact are provided herein.

SECTION 2

SUMMARY OF TEST NUMBER CE0301

A load cell barrier consisting of 36 load cells (Figure 4) was impacted by a 1984 Dodge Daytona 2-door hatchback at a velocity of 35.4 mph. The test was performed at the Calspan Corporation Advanced Technology Center on December 20, 1983. Pre- and post-test photographs of the vehicle and occupants can be found in Appendix A. Table 1 presents pertinent crash test information.

Two Part 572, 50th percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions, according to dummy placement procedures specified in Laboratory Procedure for Vehicle Assessment IP-212-02.

The occupant dummies were instrumented with head and chest triaxial accelerometers and femur load cells. Load cells were also placed on the lap and shoulder belts to measure dummy torso and lap loading. The driver ATD (Serial No. 749) had been certified prior to this test. The right-front passenger ATD (Serial No. 320) had been used in a previous test (CE0107). The FMVSS Injury Criteria Values were not exceeded in those tests. Certification details, along with instrumentation calibration data, are found in Appendix C.

The crash event was recorded by one real-time camera and 15 high-speed cameras. Camera locations and other pertinent camera information are found in Section 4 of this report.

The 67 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces. The Injury Criteria Values are presented in summary form in Table 10.

Table 1

CRASH TEST SUMMARY

TEST NO. CE0301 PROJECT: FY84 New Car Assessment Program
FMVSS No. 208/212/301-75
 DATE: 12/20/83 TIME: 1406 hrs. TEMP: 20°F.

VEHICLE 1984 Dodge Daytona 2-door hatchback
 TEST WEIGHT (lbs) 3000
 IMPACT ANGLE (deg)* 0
 IMPACT VELOCITY (mph)** 35.4
 MAX. CRUSH (in) static 24.3
 MAX. INTRUSION (in) 9.0

DUMMIES

TYPE	<u>Hybrid II Part 572</u>	<u>Hybrid II Part 572</u>
LOCATION	<u>LF (1) Serial 749</u>	<u>RF (2) Serial 320</u>
RESTRAINT	<u>production 3-point belt system</u>	<u>production 3-point belt system</u>
NUMBER OF DATA CHANNELS	<u>67</u>	
NUMBER OF HIGH SPEED CAMERAS	<u>15 + 1 real time</u>	

*With respect to tow track Centerline

**Speed trap measurement (+ .05% accuracy)

GENERAL COMMENTS

The 1984 Dodge Daytona 2-door hatchback was equipped with a 2.2 liter, 4-cylinder engine, five-speed manual transmission, power brakes and power steering. The total test weight with two 50th percentile male dummies, instrumentation and two on-board cameras was 3000 pounds.

The 1984 Dodge Daytona 2-door hatchback which was involved in a frontal load cell barrier crash at a velocity of 35.4 mph appeared to comply with FMVSS Nos. 212, "Windshield Mounting" and 301-75, "Fuel System Integrity." There was 100 percent windshield retention and no fuel leakage after impact or any phase of the rollover test.

The vehicle sustained 24.3 inches of static crush and approximately 35.0 inches of dynamic crush. Maximum firewall intrusion into the occupant compartment was 9.0 inches. The maximum load cell barrier force measured by the 36 load cells was 69,000 pounds at 51 milliseconds.

The driver's head and chest struck the steering wheel. The femurs contacted the dash panel. The driver did comply with all FMVSS 208, "Injury Criteria" with a HIC of 507.2, maximum chest deceleration over 3 milliseconds of 37.2 g's and femur loads of 860 and 740 pounds.

The right-front passenger satisfied all FMVSS 208, "Injury Criteria" with a HIC of 566.2, maximum chest deceleration over 3 milliseconds of 40.2 g's and femur loads of 530 and 950 pounds.

GENERAL TEST AND VEHICLE PARAMETER DATA

Make/Model Dodge Daytona Body Style 2-door hatchback
Model Year 1984 NHTSA No. CE0301 Color gun metal blue
Engine Data: 4 cylinders, 2.2 liters
Transmission Data: 5 speed, (X) manual () automatic
Date Rec'd 12/8/83 Air Cond. NA Pw. Str. Yes Pw. Brks. Yes
Dealer's Name & Address Fairway Dodge - Hamburg, NY
Odometer Reading 42

Vehicle Manufactured by: Chrysler Corporation
Date of Manufacture 10/83 VIN 1B3BA44D8EG125189
GVRW 3495 lbs., GAWR: front 1900 lbs., rear 1645 lbs.

Vehicle Load (up to capacity): front 35 psi
rear 35 psi

Recommended Tire Size P195/60R15 Load Range X B C D

Recommended Cold Tire Pressure: front 35 psi, rear 35 psi

Tires on Vehicle P185/70R14

Is Spare Tire a "Space Saver?" X yes no

Is Spare Tire Standard Equipment? X yes no

Vehicle Capacity: Types of Seats: bench, X bucket, split bench

Number of Occupants (Designated Seating Capacity): 2 front
2 rear
4 TOTAL

RCLW Cargo Load: 115 lbs.

VCW TOTAL = 715 lbs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW

Right Front = 760 lbs. Right Rear = 470 lbs.
 Left Front = 780 lbs. Left Rear = 540 lbs.
 TOTAL FRONT WEIGHT = 1540 lbs. (60.5 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1010 lbs. (39.5 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 2550 lbs.

CALCULATION FOR TARGET TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight
 UDW = Unloaded Delivered Weight (2550 lbs.)
 VCW = Vehicle Capacity Weight (715 lbs.)
 DSC = Designated Seating Capacity (4)
 RCLW = VCW - 150 (DSC) = 115 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies X 164 lbs./dummy)
 Target Test Weight = 2993 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND POUNDS CARGO

Right Front = 860 lbs. Right Rear = 620 lbs.
 Left Front = 840 lbs. Left Rear = 680 lbs.
 TOTAL FRONT WEIGHT = 1700 lbs. (56.7 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1300 lbs. (43.3 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 3000 lbs.

Weight of ballast secured in vehicle trunk area = 0 lbs.

* Removed wheel covers and air foil off rear.

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 27.1 LF 27.2 RR 27.2 LR 26.7
 Test Attitude: RF 26.2 LF 26.3 RR 25.8 LR 25.1

Remarks: Wheelbase = 96.75 inches

CG = 41.92 inches aft of front wheel C/L

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)POST-IMPACT DATA

Type of Test frontal barrier Impact Angle 0°
 Date of Test 12/20/83 Time of Test 1406
 Ambient Temperature 20 °F at impact area
 Temperature in Occupant Compartment 72 °F
 Windshield Molding Temperature 52 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 35.4 mph, secondary 35.37 mph

VEHICLE REBOUND AND CRUSH (inches)

Vehicle Length: Pre-test = R 171.3 C 174.8 L 171.2
 Post-test = R 150.5 C 150.5 L 151.1
 Crush = R 20.8 C 24.3 L 20.1
 Distance from front of test vehicle to point of impact:
 R 17.9 C/L 18.0 L 18.5

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>	<u>Passenger</u>
Head	<u>steering wheel</u>	<u>none</u>
Chest	<u>steering wheel rim</u>	<u>none</u>
Abdomen	<u>none</u>	<u>none</u>
Left Knee	<u>dash panel</u>	<u>dash panel</u>
Right Knee	<u>dash panel</u>	<u>dash panel</u>

	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
Door Opening	<u>operable</u>	<u>operable</u>

Table 2 (cont'd)

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

<u>Seat Movement</u>	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>intact</u>	<u>bent rearward</u>
Seat Shift (in.)	<u>2.2" forward</u>	<u>1" forward</u>

Glazing Damage

Backlight/Windshield Windshield shattered

Other notable impact effects: Passenger and driver slid forward on seat.

SECTION 3

SUMMARY OF RESULTS OF FMVSS NOS. 212 AND 301-75

- Summary of FMVSS 212 and 301 Data
- Post-Impact Data for FMVSS Nos. 212 and 301-75
- Windshield Retention, FMVSS No. 212 Data
- Fuel System Integrity, FMVSS No. 301-75 Data

Table 3
SUMMARY OF FMVSS 212 AND 301 DATA

PRE-IMPACT DATA

Make/Model: Dodge Daytona
Body Style: 2-door hatchback Model Year: 1984
NHTSA No.: CE0301 Color: gun metal blue

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Corporation
Date of Manufacture: 10/83 VIN: 1B3BA44D8EG125189
GVWR: 3495 lbs., GAWR: Front 1900 lbs., Rear 1645 lbs.

POST-IMPACT DATA

Type of Test: frontal load cell barrier impact
Date of Test: 12/20/83 Time: 1406 hrs. Temp.: 20 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 35.4 mph, Secondary = 35.37 mph
Test Weight 3000 lbs., Static Crush Max. 24.3 in., Rebound 18.0 in.

FUEL SYSTEM DATA

Test Fluid Type: Red Stoddard Solvent #2, Spec. Grav.: 0.764
Kinematic Viscosity 0.96 Centistokes
EPA Capacity* 14.0 gal.
Test Volume 13.0 gal. (93% of EPA Capacity)
Fuel System Capacity (data from Owner's Manual) 14.0 gal.
Electric Fuel Pump? X yes no, Fuel Injection? X yes no
Does electric fuel pump operate with ignition switch "on" and the engine
not operating? yes X no

Test vehicle fuel tank filled to 93% of "usable" capacity with
Stoddard Solvent and with electric fuel pump operating (if it will
operate without engine operation) until start of static roll.

*with entire fuel system filled from fuel tank through carburetor bowl

Table 3

SUMMARY OF FMVSS 212 AND 301 DATA (cont'd)

Details of fuel system: Fuel tank is forward of rear wheels and held in
place by two tank straps. Filler tube is on right side of vehicle and is
sealed by a screw-ratchet type cap which is concealed by a hinged door.

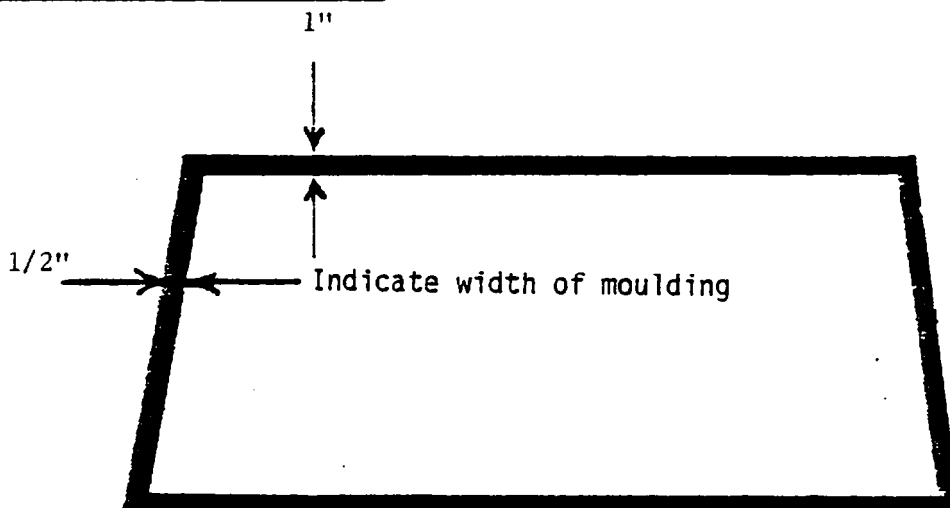
Details of windshield mounting (method of retention, type of trim, etc.):

Windshield is bonded in place and has a one inch rubber molding along the top and a half inch plastic molding on each side.

	Windshield Periphery		
	Pre-Test (in.)	Post-Test (in.)	Retention %
Right Side	82.25	82.25	100
Left Side	82.25	82.25	100
TOTAL	164.5	164.5	100

The standard requires that Post-Test be a minimum of 75 percent of the Pre-Test total periphery measurement for vehicle not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE



FRONT VIEW

Figure 1 WINDSHIELD RETENTION, FMVSS NO. 212 DATA

Table 5

"FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA

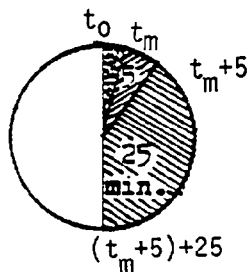
FMVSS No. 301-75

TEST VEHICLE NHTSA NO. CE0301 Test Date 12/20/83
 Vehicle Manufacture/Make/Model 1984 Dodge Daytona 2-door hatchback

Test vehicle fuel tank filled to 90-91% of capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE

- ☒ Frontal (35 mph)
☐ Oblique (30 mph) with _____° barrier face first contacting
 _____ driver _____ passenger side
☐ Rear Moving Barrier (35 mph)
☐ Lateral Moving Barrier (20 mph)

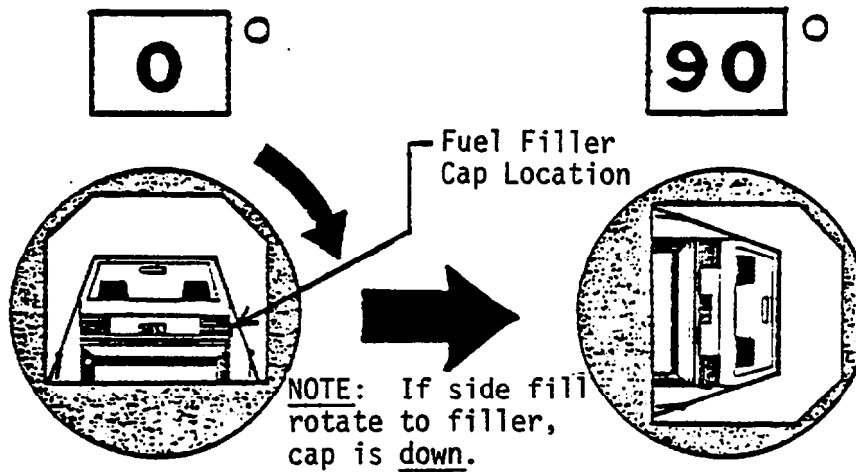
FUEL SPILLAGE MEASUREMENT

	Actual	Max. Allow.
From impact until vehicle motion ceases	0	1 oz
For 5 min. period after vehicle motion ceases	0	5 oz
For next 25 min.	0	1 oz/1 min

SOLVENT SPILLAGE DETAILS

None

Table 6

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEETTEST PHASEDETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 48 seconds
(Spec. Range = 1 to 3 min.)

FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds

TOTAL = 7 minutes 48 seconds

Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

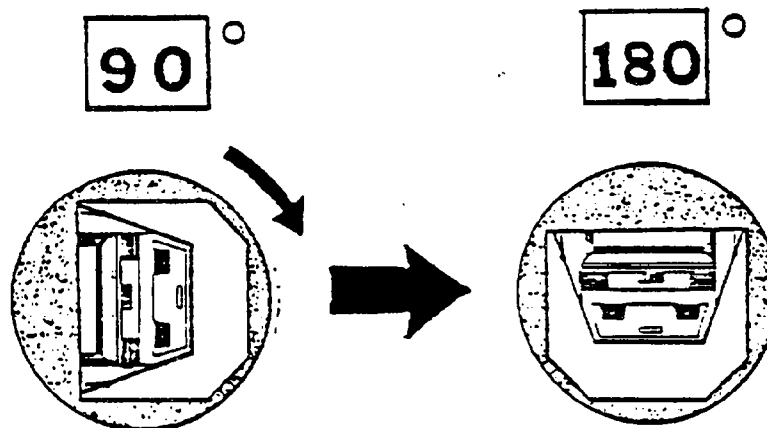
None

VEHICLE NHTSA ID NO. CE0301

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 52 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 52 seconds
Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

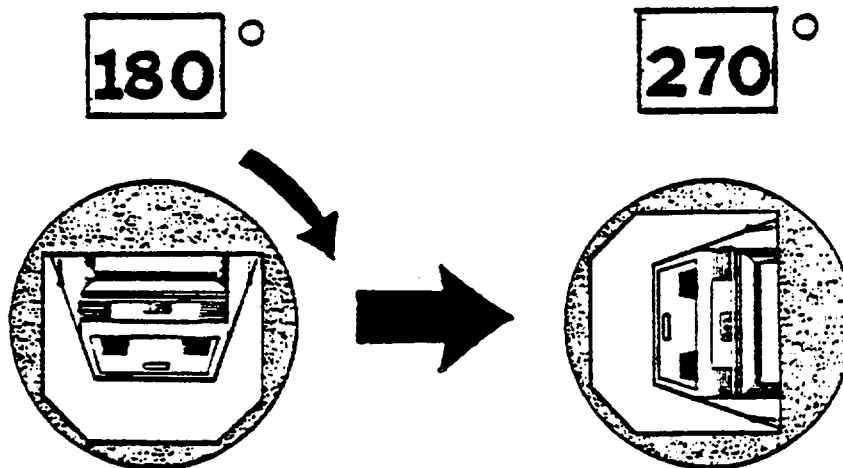
0	0	0	0
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

None

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEETTEST PHASEDETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 56 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 7 minutes 56 seconds
 Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

NOTE: . Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

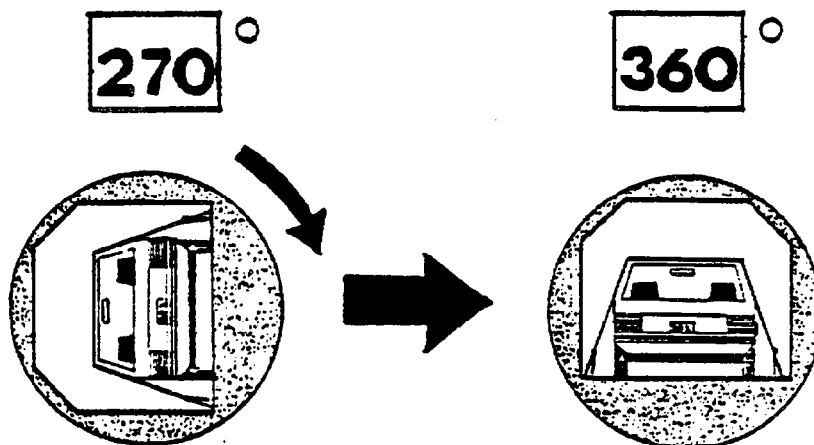
None

VEHICLE NHTSA ID NO. CE0301

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 3 minutes 00 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 8 minutes 00 seconds
 Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

None

SECTION 4

OCCUPANT AND VEHICLE INFORMATION (OMI AND AID DATA)

- Vehicle Measurements
- Vehicle Accelerometer Locations
- Load Cell Barrier-Load Cells Locations
- AID Data Summary
- Camera Positions and Locations
- Owner's Manual Seat Belt Instructions
- Dummy In-Vehicle Positioning
- Dummy Injury Criteria Values
- Belt Related Data

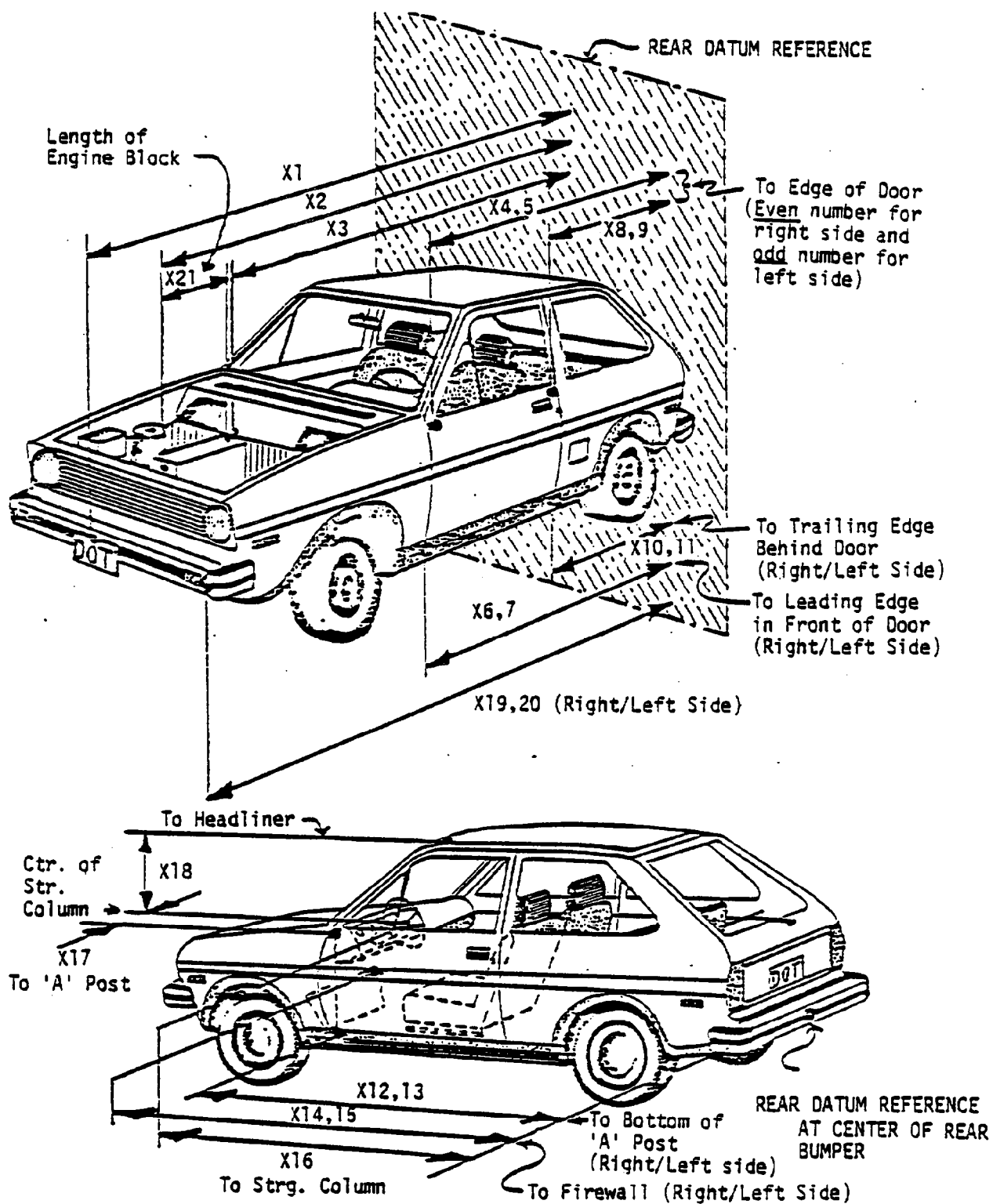
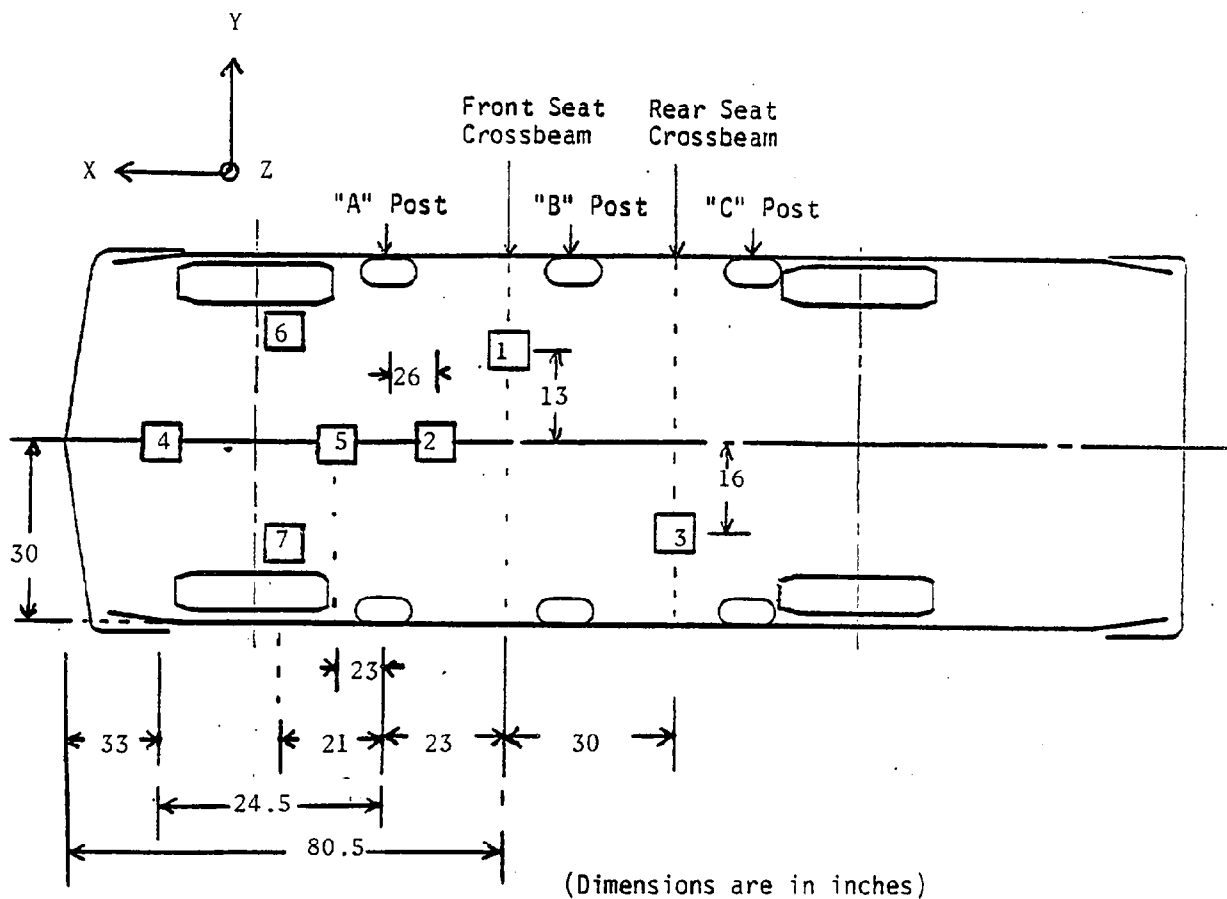


Figure 2 PRE- AND POST-TEST MEASUREMENT POINTS

Table 7

VEHICLE MEASUREMENTS

		All Dimensions in Inches		
No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	174.8	150.5	24.3
X2	Rear Surface of Vehicle to Front of Engine	142.4	136.5	5.9
X3	Rear Surface of Vehicle to Firewall	127.9	120.9	7.0
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	113.2	113.1	.1
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	113.0	112.8	.2
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	112.7	112.5	.2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	112.5	112.4	.1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	58.1	57.9	.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	58.0	57.8	.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	65.7	65.6	.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	65.5	65.3	.2
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	113.2	113.1	.1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	113.1	113.1	0
X14	Rear Surface of Vehicle to Firewall, Right Side	124.3	116.1	8.2
X15	Rear Surface of Vehicle to Firewall, Left Side	125.2	116.2	9.0
X16	Rear Surface of Vehicle to Steering Column	97.0	93.4	3.6
X17	Center of Steering Column to "A" Post	17.0	13.5	3.5
X18	Center of Steering Column to Headliner	16.8	13.0	3.8
X19	Rear Surface of Vehicle to Right Side of Front Bumper	171.3	150.5	20.8
X20	Rear Surface of Vehicle to Left Side of Front Bumper	171.2	151.1	20.1
X21	Length of Engine Block	15.0	15.0	--



ACCELEROMETER NUMBER *	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Front Seat Crossmember	X		
2	Vehicle C.G.	X		
3	Rear Seat Crossmember	X		
4	Top of Engine	X		
5	Bottom of Engine	X		
6	Right Front Brake Caliper	X		
7	Left Front Brake Caliper	X		

*The accelerometer pack number can be correlated with the vehicle response data traces found in Appendix B.

FIGURE 3 VEHICLE ACCELEROMETER LOCATIONS

36 LOAD CELLS
4 ROWS
9 COLUMNS

FRONT VIEW

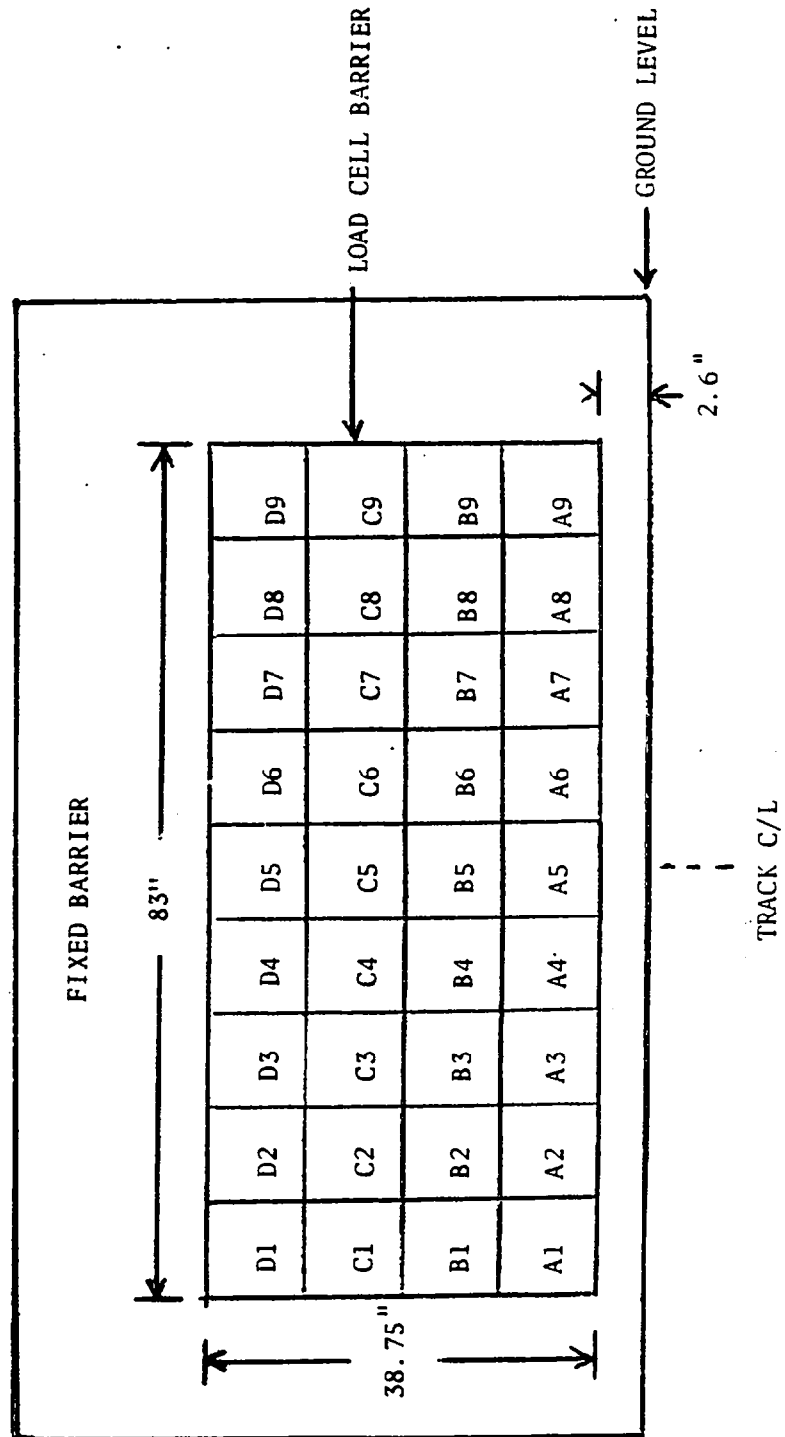


Figure 4 FIXED LOAD CELL BARRIER-LOAD CELL LOCATIONS

Table 8
ACCIDENT INVESTIGATION DIVISION
Data Summary

Test No. CE0301
Date 12/20/83

Vehicle No. 1

Impact Description	<u>frontal load cell barrier</u>
Make	<u>Dodge Daytona</u>
Model	<u>2-door hatchback</u>
Year	<u>1984</u>
Size Category	<u>mid-size</u>
Test Weight (lb.)	<u>3000</u>
Wheelbase (in.)	<u>96.75</u>
Front Overhang (in.)	<u>40.6</u>
Overall Width (in.)	<u>69.3</u>
Accelerometer Location	<u>41.92 inches aft of front wheel C/L</u>
Calibration Procedure	<u>shaker table/least squares</u>
Accelerometer Linearity	<u>+ 0.75%</u>
Integration Algorithm	<u>Hybrid Simpson-Newton 3/8</u>
Impact Speed (mph)	<u>35.4</u>
Time of Separation (msec)	<u>281.77</u>
Velocity Change (mph)	<u>38.8</u>
CDC	<u>12 FDEW3</u>
Damage Length (in.)	L: <u>174.8</u>
Crush Dimensions (in.)	C1: <u>19.8</u>
	C2: <u>23.3</u>
	C3: <u>24.8</u>
	C4: <u>23.3</u>
	C5: <u>21.8</u>
	C6: <u>20.1</u>
Midpoint of Damage	D: <u>0</u>

National Accident Sampling System — Continuous Sampling Subsystem: Vehicle Data

FIELD MEASUREMENTS

1984 Dodge DAYTONA 1B3BA44DBE6125189

Complete When Applicable

End Damage	Side Damage
Undeformed end width <u>58.6</u> Corner shift: A1 _____ A2 _____ End shift at frame (CDC) (check one) < 4 inches _____ ≥ 4 inches _____	Bowing: B1 _____ X1 _____ B2 _____ X2 _____ Bowing constant <u>N</u> $\frac{X1 + X2}{2} = \underline{A}$

Note: Measure C1 to C6 from Driver to Passenger side in Front or Rear impacts—
Rear to Front in Side impacts.

CDC = 12FDEW3

Specific Impact Number	Plane* of C-Measurements	Direct Damage		Field L**	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	±D
		Width** (CDC)	Max*** Crush								
1	Bumper	58.6	25.3	58.5	23.8	25.1	25.3	23.8	23.6	24.1	0
	Free space		1.5		-4.0	-1.8	-5	-5	-1.8	-4.0	
	ACTUAL CRUSH		24.8	58.5	19.8	23.3	24.8	23.3	21.8	20.4	0

*Identify the plane at which the C-measurements are taken (e.g., at bumper, above bumper, at sill, above sill, at beltline, etc.) or label adjustments (e.g., free space).

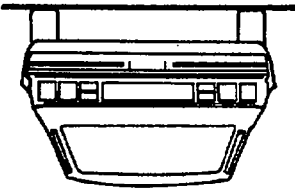
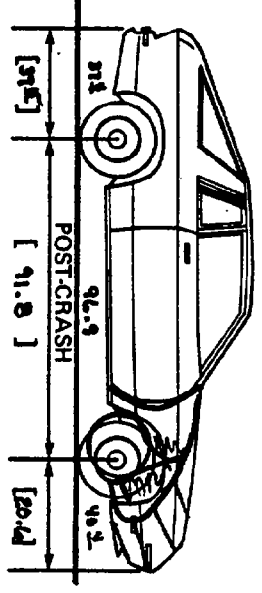
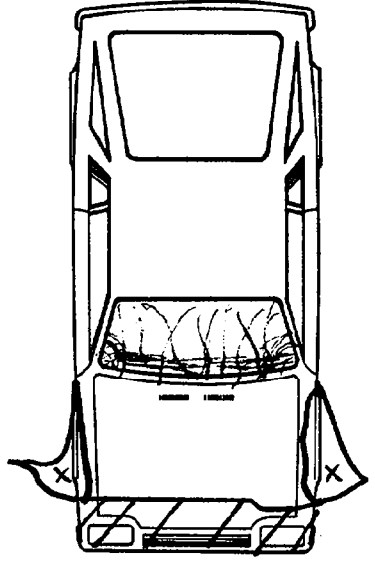
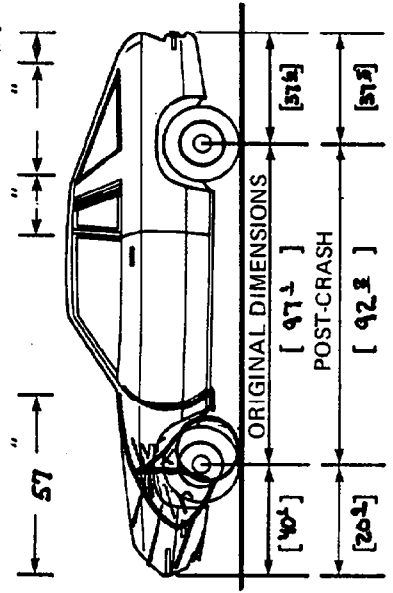
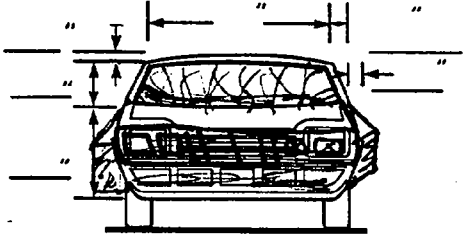
Free space value is defined as the distance between the baseline and the original body contour taken at the individual C locations. This may include the following: bumper lead, bumper taper, side protrusion, side taper, etc. Record the value for each C-measurement and maximum crush.

**Measure and document on the vehicle diagram the beginning or end of the direct damage width and field L (e.g., side damage with respect to undamaged axle).

***Measure and document on the vehicle diagram the location of the maximum crush.

Note: Use as many lines/columns as necessary to describe each damage profile.



DAMAGE DESCRIPTION		TYPE OF TRANSMISSION	WHEEL STEER ANGLES
Tire—Wheel Damage		☒ <u>5 spd</u> Manual ☐ Automatic	(For locked front wheels or displaced rear axles only)
a. Rotation physically restricted	b. Tire deflated	Average Track: _____	RF <u>0.1</u> °
RF <u>1</u>	RF <u>2</u>	Maximum Width: _____	LF <u>0.5</u> °
LF <u>1</u>	LF <u>2</u>	Test Gross Weight: _____	RR <u>N/A</u> °
RR <u>2</u>	RR <u>2</u>	Overall Length: <u>174.8</u>	LR <u>N/A</u> °
LR <u>2</u>	LR <u>2</u>	Engine Size: cyl. <u>4</u>	Within ± 5 degrees
(1) Yes, (2) No, (8) NA, (9) Unk.			
Vehicle No.: <u>1</u>		displ. <u>2.2 - R.I.</u>	
<u>1984 Dodge DAYTONA</u>			
<u>1B3BA4YD856125109</u>			
			$\begin{array}{r} Q = 174.8 \\ - 150.5 \\ \hline 24.3 \end{array}$
			
			
Note: Sketch new perimeter and cross hatch direct damage and single hatch induced damage on all views. Annotate observations which might be useful in reconstructing the accident (e.g., grass in tire bead, direction of striations, scuff on sidewall, etc.) If pulling trailer sketch type of trailer and damage received on reverse side. Annotate any damage caused by extrication such as component removal by torching, prying or hydraulic shears.			

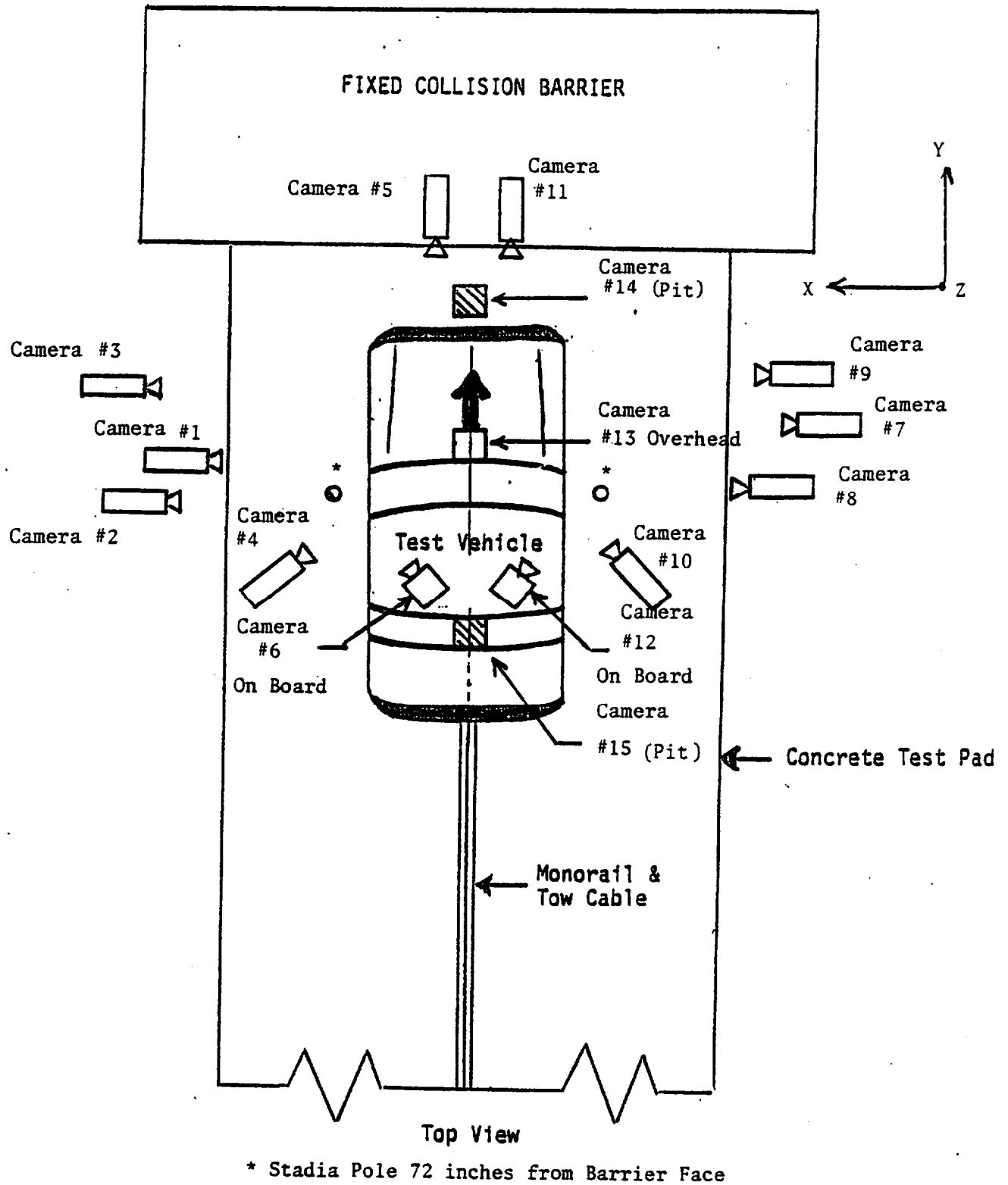


Figure 6 -- CAMERA POSITION FOR FRONTAL IMPACTS

Table 9
HIGH-SPEED CAMERA LOCATIONS

Test No. CE0301 Vehicle 1984 Dodge Daytona 2-door hatchback

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Vehicle Left Side	230	54	56	-6	-	13	NO TIMING
2	Driver	246	72	48	-0	208	35	1010
3	Driver	315	26	59	-3	277	50	880
4	Driver	90	108	72	-22	-	13	NO TIMING
5	Driver (Barrier)	20	0	70	-30	85	13	NO TIMING
6	Left Belt Retractor	-	-	-	-	-	8	NO TIMING
7	Vehicle Right Side	281	41	48	-2	-	13	880
8	Passenger	268	66	45	-3	230	35	880
9	Passenger	228	24	44	-3	274	50	980
10	Passenger	90	104	69	-21	-	13	NO TIMING
11	Passenger (Barrier)	20	0	70	-30	85	13	NO TIMING
12	Right Belt Retractor	-	-	-	-	-	8	1440
13	Overhead	0	40	216	-90	-	25	1000
14	Engine (Pit.)	0	36	-120	90	-	25	1080
15	Fuel Tank (Pit.)	0	140	-120	90	-	25	NO TIMING

*X = film plane to monorail centerline
Y = film plane to impact location
Z = film plane to ground
** = referenced to horizontal plane

Seats, Seat Belts, Mirrors

Seat Belts

Always use the seat belts. The chance of a serious injury is greatly reduced when the seat belts are properly used.

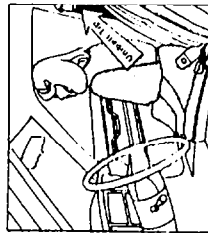
Seat belts provide protection against being thrown from the vehicle as well as reducing the risk of an injury caused by striking the interior of the vehicle.

The following pages contain the recommended procedures for fastening, adjusting and wearing the belts for maximum comfort and safety.

Front Seats

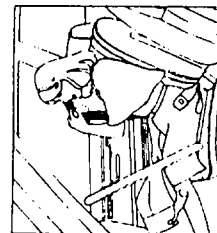
The "UNIBELT", or single continuous-belt restraint system, is installed for the driver and front seat passenger. This system incorporates a vehicle sensitive shoulder belt retractor, designed to lock (i.e. restrict belt travel) **only during very sudden stops or impacts**. This feature allows the shoulder belt to move freely with the wearer. It will not lock by jerking or pulling the webbing.

1. Enter the vehicle and close the door. Sit well back and erect and adjust the seat. Note the metal tip of the unbelt in its stowed position.



1

2. Grasp the metal tip and slide it up the webbing as far as necessary to go around your lap as you pull out the webbing. A couple of tries and this will become an automatic one handed operation.



2

3. As you pull the webbing across your lap and over your shoulder, move the metal tip toward the buckle.

Insert the tip into the buckle until a "click" is heard.

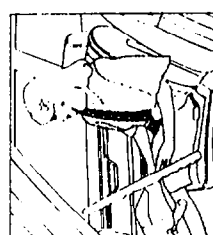
Do not wear the shoulder belt under your arm or otherwise out of position. Such use could increase the chance and/or severity of injury in an accident.



3



4



5



6

4. Position the lap belt with the upper edge of the belt drawn across the thighs and snug against the hips. Slack will automatically be removed due to tension created by the retractor. If a snug fit in the lap belt portion is desired, pull up on the shoulder belt as shown. A snug belt reduces the risk of sliding under the belt in a collision.

5. If the shoulder belt feels too tight, move your shoulder forward slightly, or withdraw an inch or so of webbing by giving a slight tug on the belt.

The belt will retain the small amount of slack necessary for comfort when you return to your normal seating position. If the belt is still too tight, pull out 6 to 8

inches of webbing, let it return to your chest and repeat the above motion. However, the amount of slack in the shoulder belt should be kept to a minimum, preferably not more than one inch. Too much slack could reduce the amount of protection because the belt may not be able to properly restrain you in an accident. The shoulder belt will allow unrestricted movement of the upper body under normal conditions. Extreme movements will probably require resetting the slack in the shoulder belt. The belt will lock in the event of an accident.

6. To release the belt, push the button on the buckle. The belt will automatically retract to its stowed position when the door is opened.

If needed, slide the tip down the webbing to allow the belt to fully retract.

Figure 7 OWNER'S MANUAL SEAT BELT INSTRUCTIONS

Figure 8
PART 572 DUMMY IN-VEHICLE POSITION

Test No. CE0301

Vehicle 1984 Dodge Daytona

SEAT TYPE:

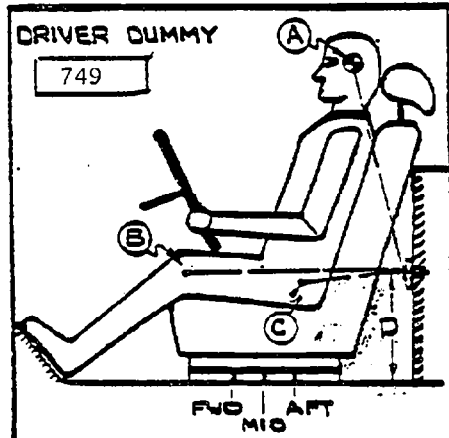
☐ Bench
☒ Bucket
☐ Split Bench

ADJUSTER TYPE:

☒ Manual
☐ Power

BUCKET SEAT BACK TYPE:

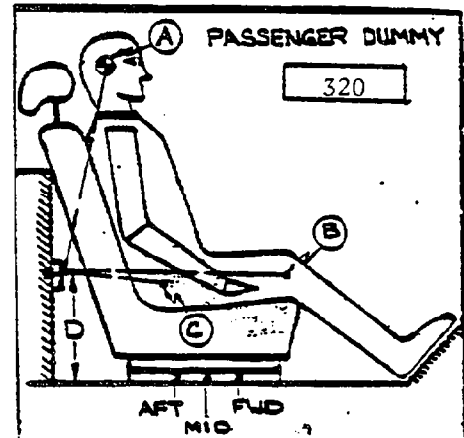
☐ Fixed
☒ Adjustable Reclining



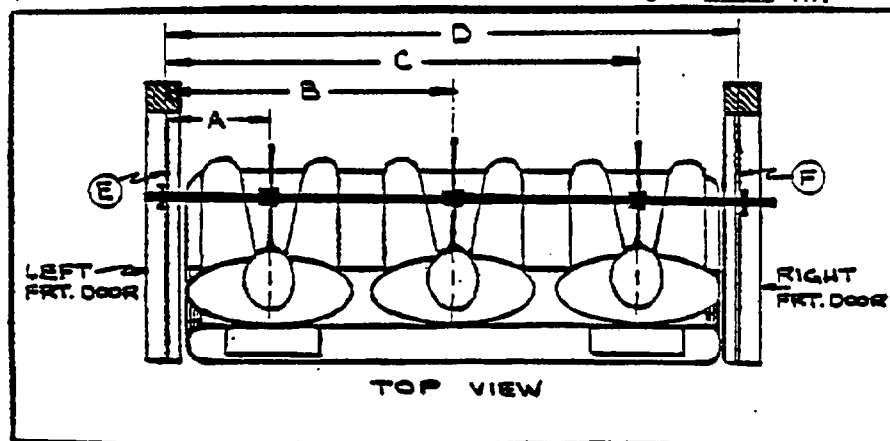
A = 24.5 in. 34 Degrees
B = 37 in. 94 Degrees
C = 21.7 in. 118 Degrees
D = 13.5 in.

MEASUREMENT
LOCATION

A - Head Target
B - Knee Joint
C - Approximate
'H' Point
D - Sill to
Reference
Point



A = 24.4 in. 33 Degrees
B = 37.4 in. 96 Degrees
C = 21.7 in. 117 Degrees
D = 13.5 in.



DUMMY ID

749

-

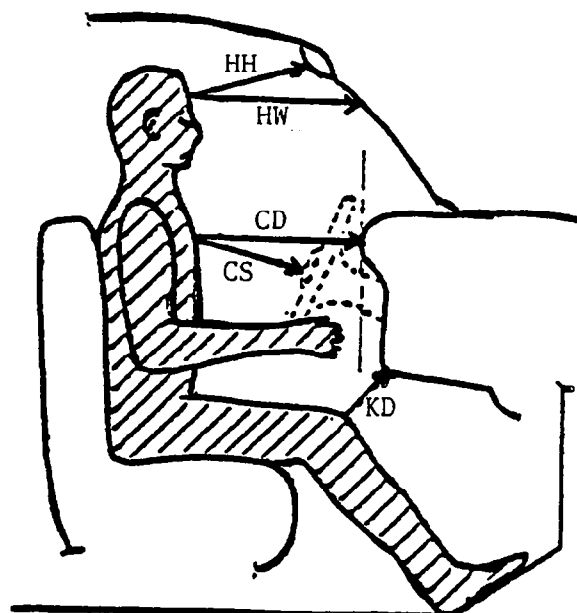
320

A = Left Door to Driver Centerline
B = Left Door to Center Passenger Centerline
C = Left Door to Right Passenger Centerline
D = Left Door to Right Door
E, F = Window Glass Height (Right and Left Must be Equal)

12.4 in.
-- in.
39.6 in.
51.9 in.
11.5 in.

NOTE: DRIVER AND PASSENGER SEAT BACKS ANGLE SPECIFIED WITH RECLINER IN SECOND POSITION

	DRIVER	PASSENGER
HH	12.9"	12.7"
HW	17.5"	17.4"
CD	21.0"	23.0"
CS	15.2"	0"
KDL	5.7"	6.7"
KDR	6.6"	6.7"
SA	SEE NOTE	SEE NOTE
TA	24°	25°



HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD = Knee to Dash
 SA = Seat Back Angle
 TA = Torso Angle

HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door

	DRIVER	PASSENGER
HR	4.9"	4.9"
HS	9.2"	9.1"
AD	4.5"	5.7"
HD	6.2"	6.7"

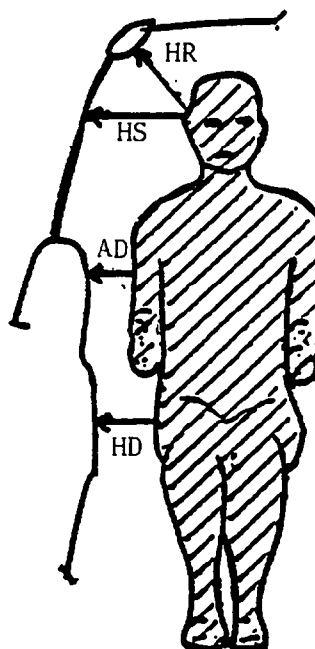


Figure 9 OCCUPANT CLEARANCE DIMENSIONS

Table 10
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-98	-20	45	101	-36	-7	-17	37.2
DUMMY (2)	91	-13	46	91	-46	-16	-17	40.2
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	860	750
DUMMY (2)	530	950
DUMMY (3)		
DUMMY (4)		

	MAXIMUM FORCE-SEAT BELTS LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	1995	--	1040
DUMMY (2)	2400	1030	--
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**				SEVERITY INDEX
	HIC	t ₁ (SEC)	t ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂	HEAD
DUMMY (1)	507.2	.05610	.11715	37.0	862.0
DUMMY (2)	566.2	.05535	.18300	28.8	805.2
DUMMY (3)					
DUMMY (4)					

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Table 11
BELT RELATED DATA

	<u>Driver</u>	<u>Passenger</u>
Belt Spool-off (in.)		
film	- obscured -	
electronic	2.45	3.0
Belt Strain ⁽¹⁾	.8" per ft.	.6" per ft.
Belt Length Data (in.)		
total length ⁽²⁾	covered	covered
retractor to "D" ring ⁽²⁾	no "D" ring	no "D" ring
torso belt ⁽³⁾	45.2	45.0
lap belt ⁽³⁾	32	32.5
remainder on spool	25.4	25.0

(1) as measured between retractor and "D" ring

(2) retractor spool to bolt hole anchor point for unbelted

(3) as measured on Part 572 dummy

APPENDIX A
PHOTOGRAPHS

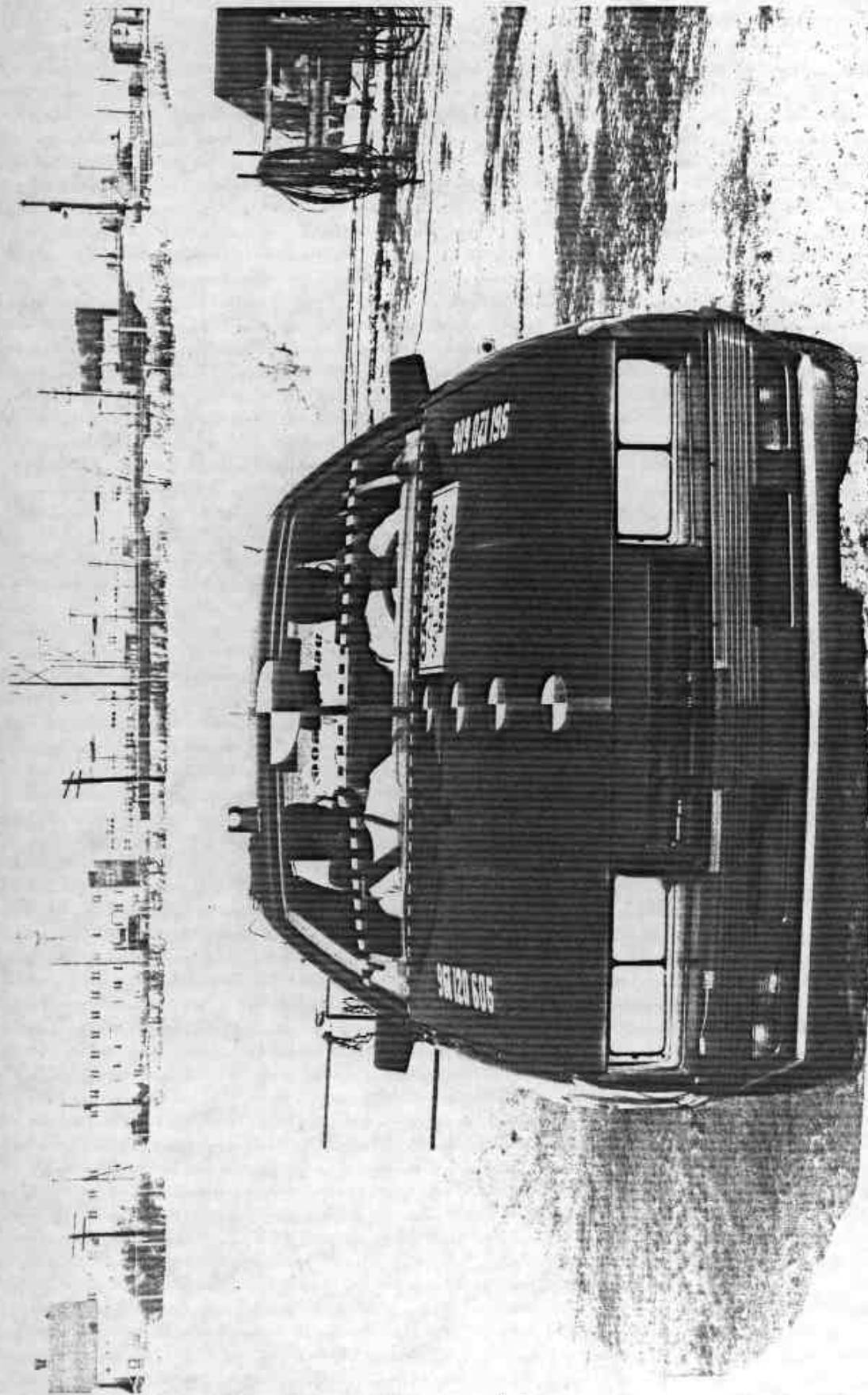


Figure A-1 PRE-TEST FRONT VIEW

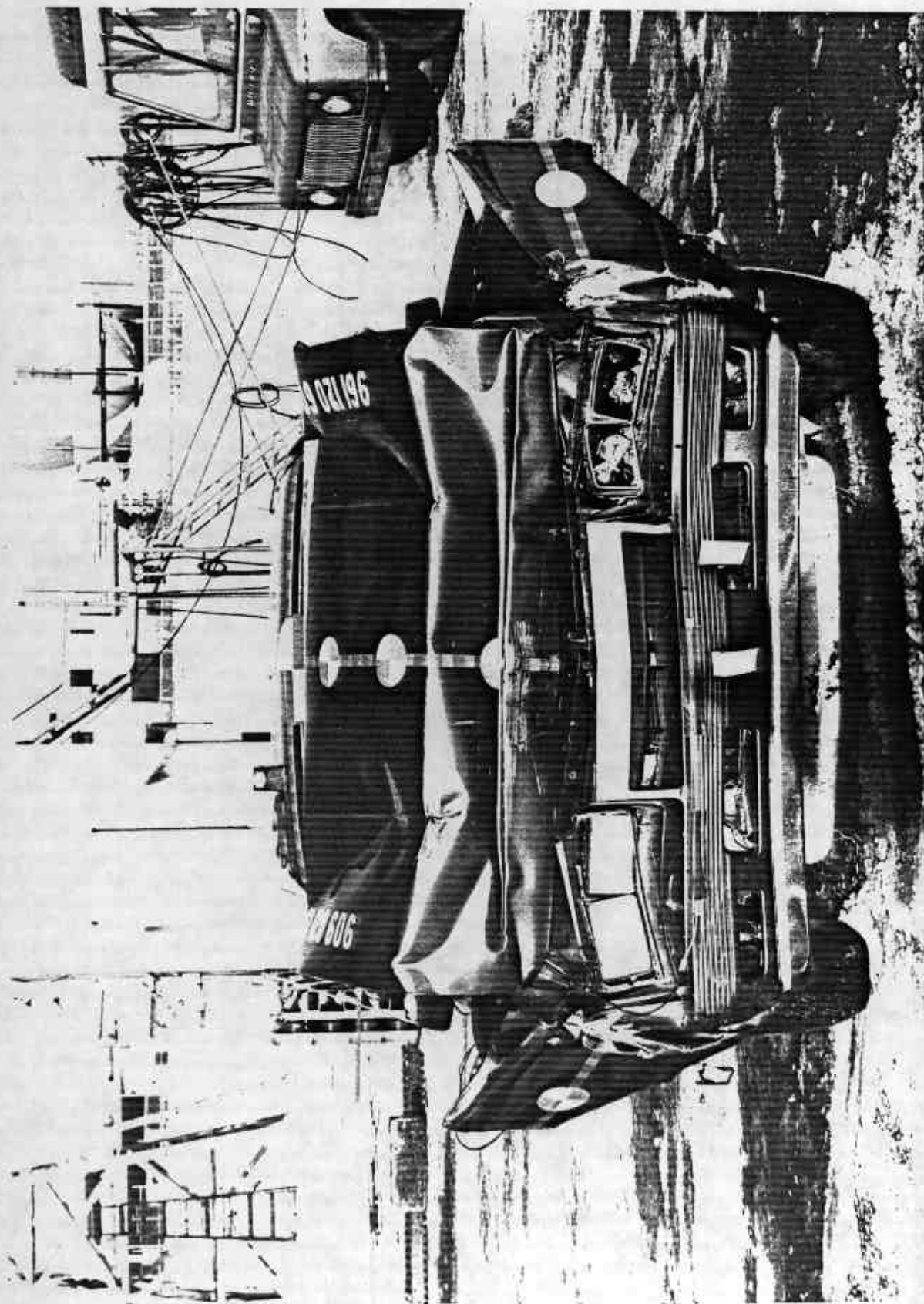
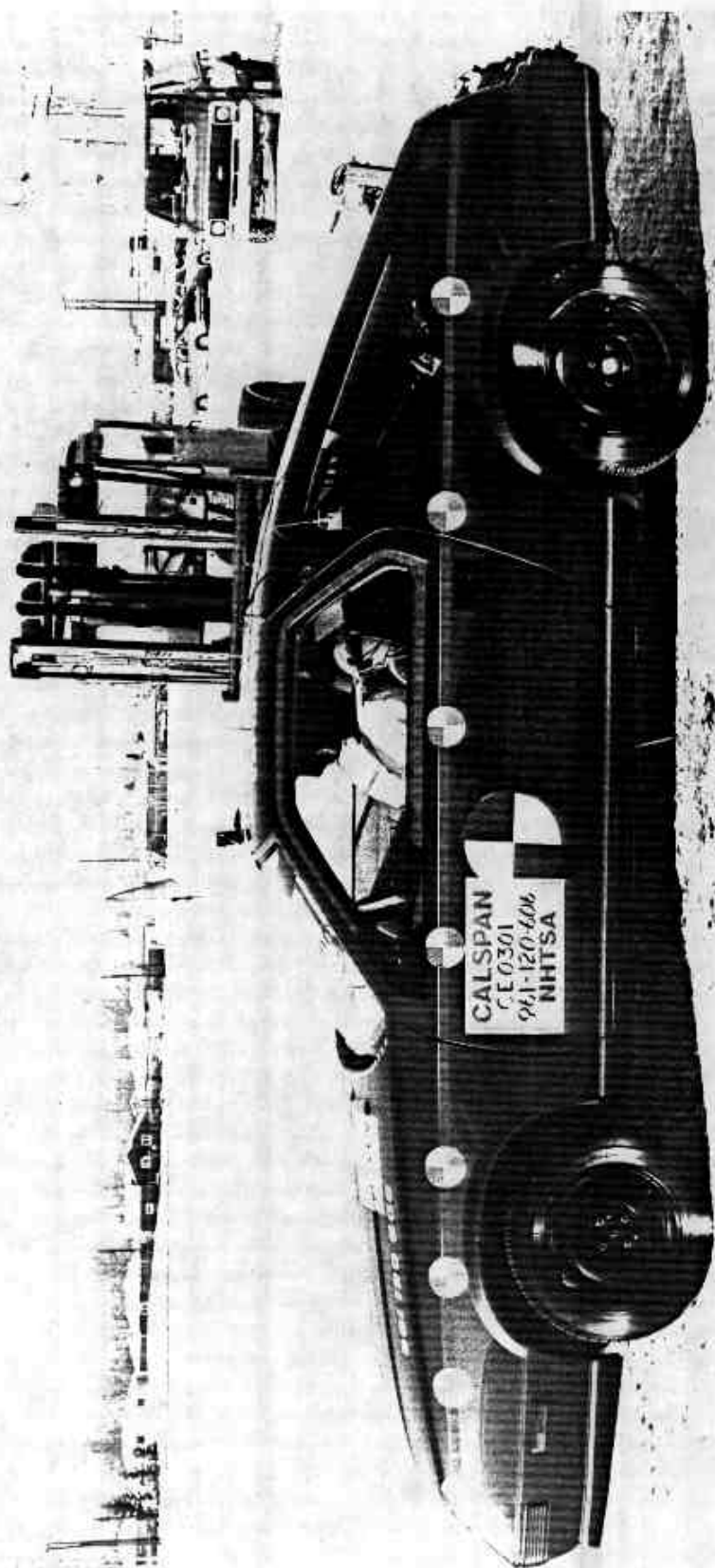


Figure A-2 POST-TEST FRONT VIEW

A-3

7209-12



A-4

7209-12

Figure A-3 PRE-TEST LEFT SIDE VIEW

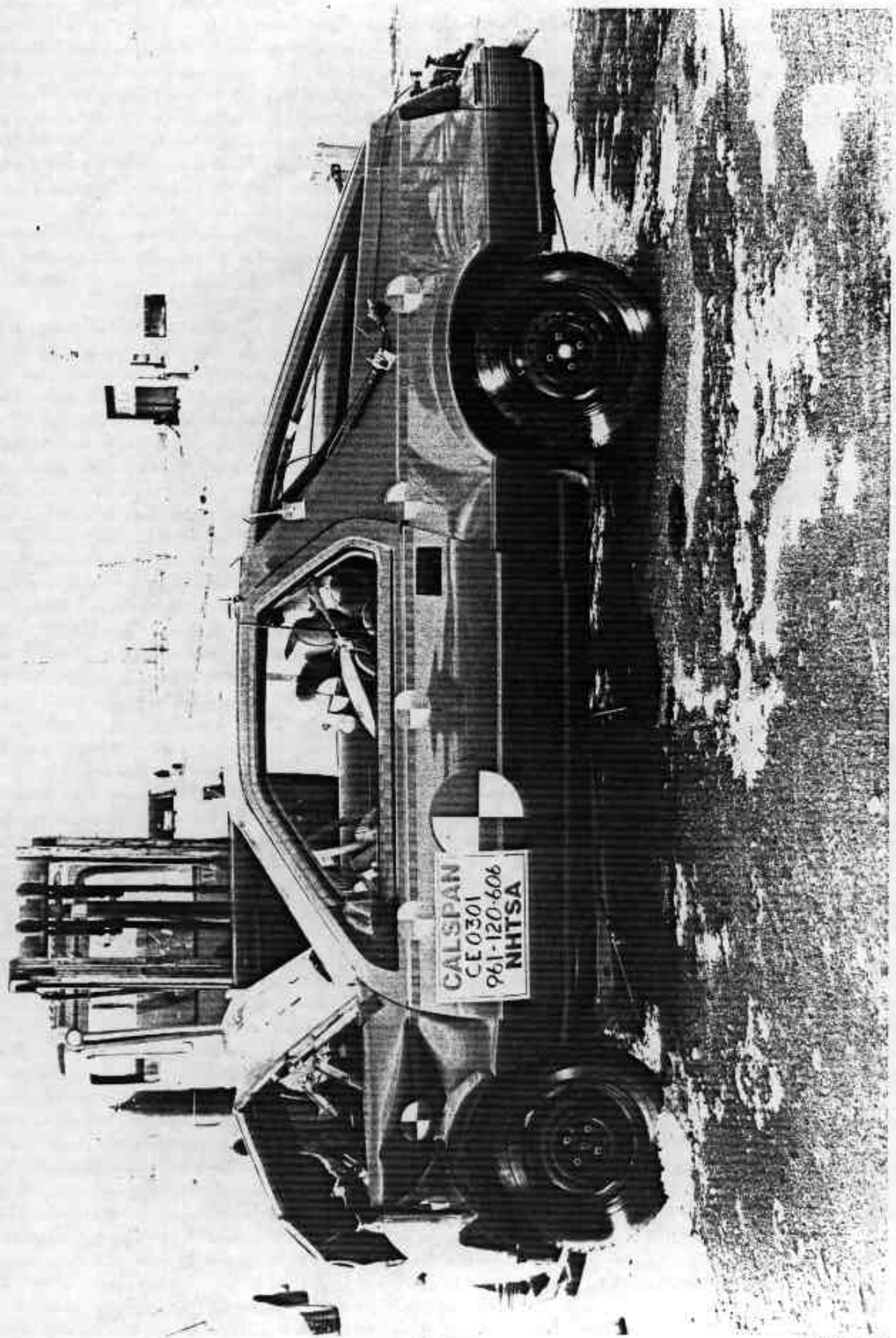


Figure A-4 POST-TEST LEFT SIDE VIEW

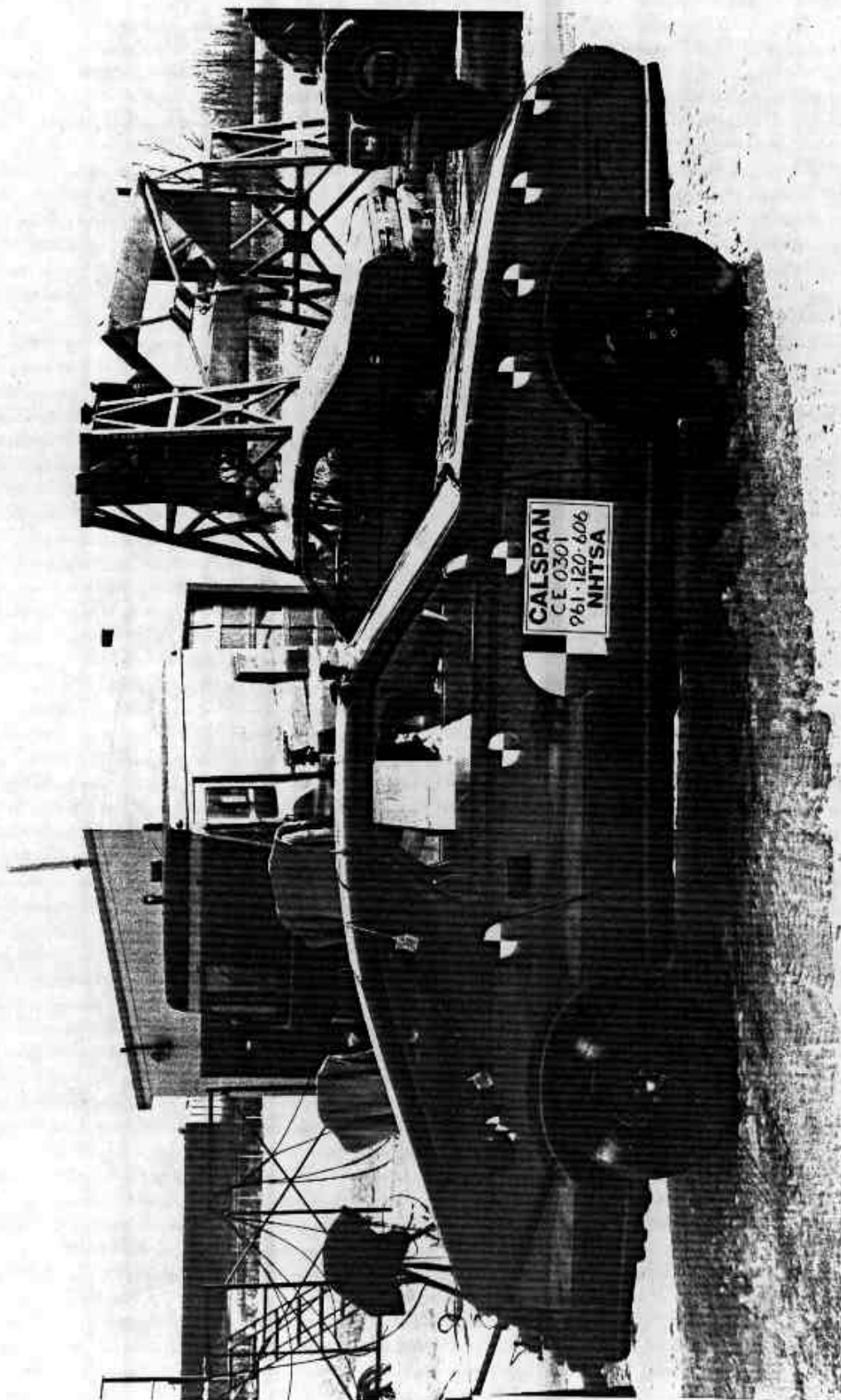


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7209-12

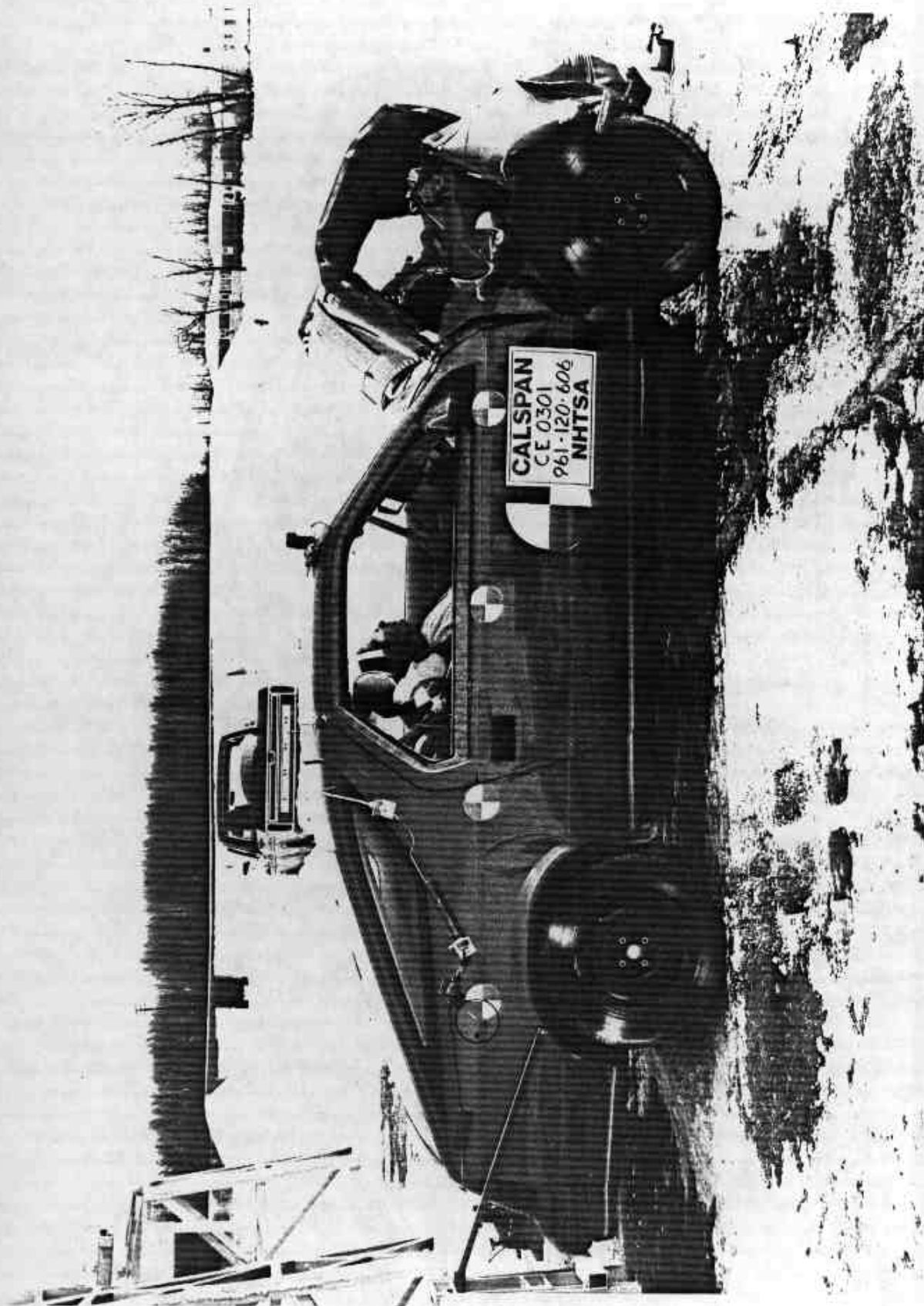


Figure A-6 POST-TEST RIGHT SIDE VIEW

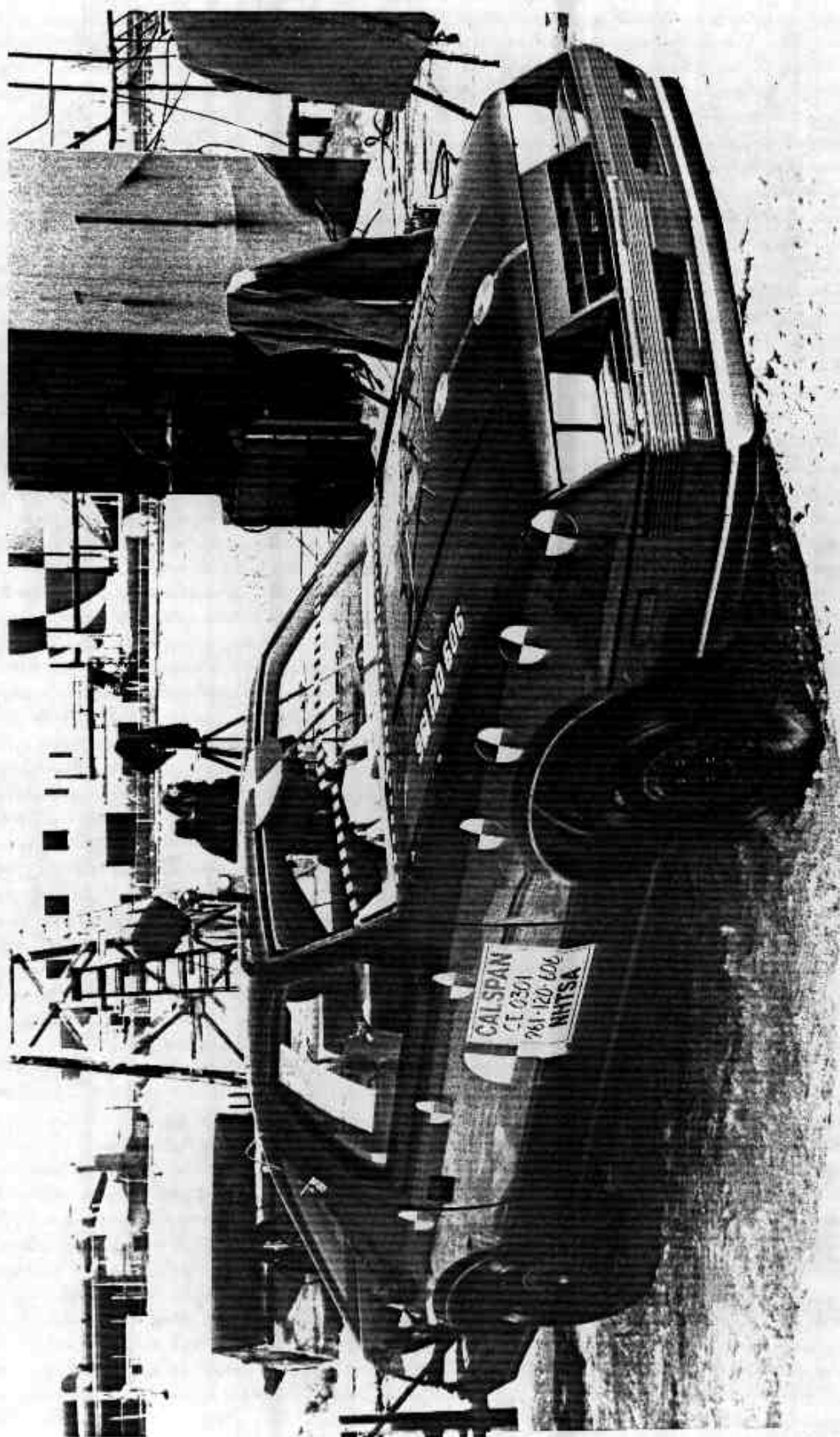


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-8

7209-12

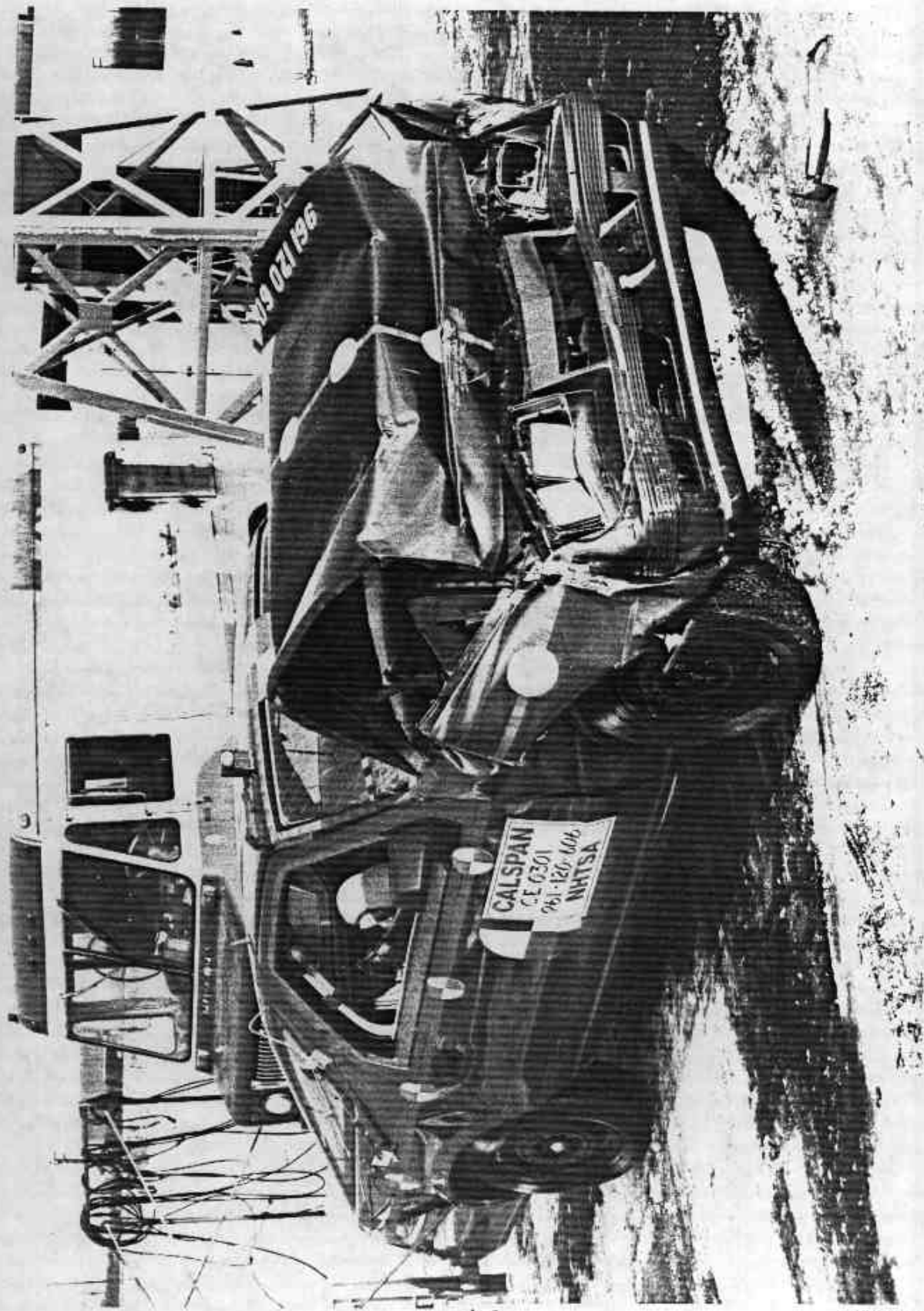


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7209-12



Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-10

7209-12



Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-11

7209-12

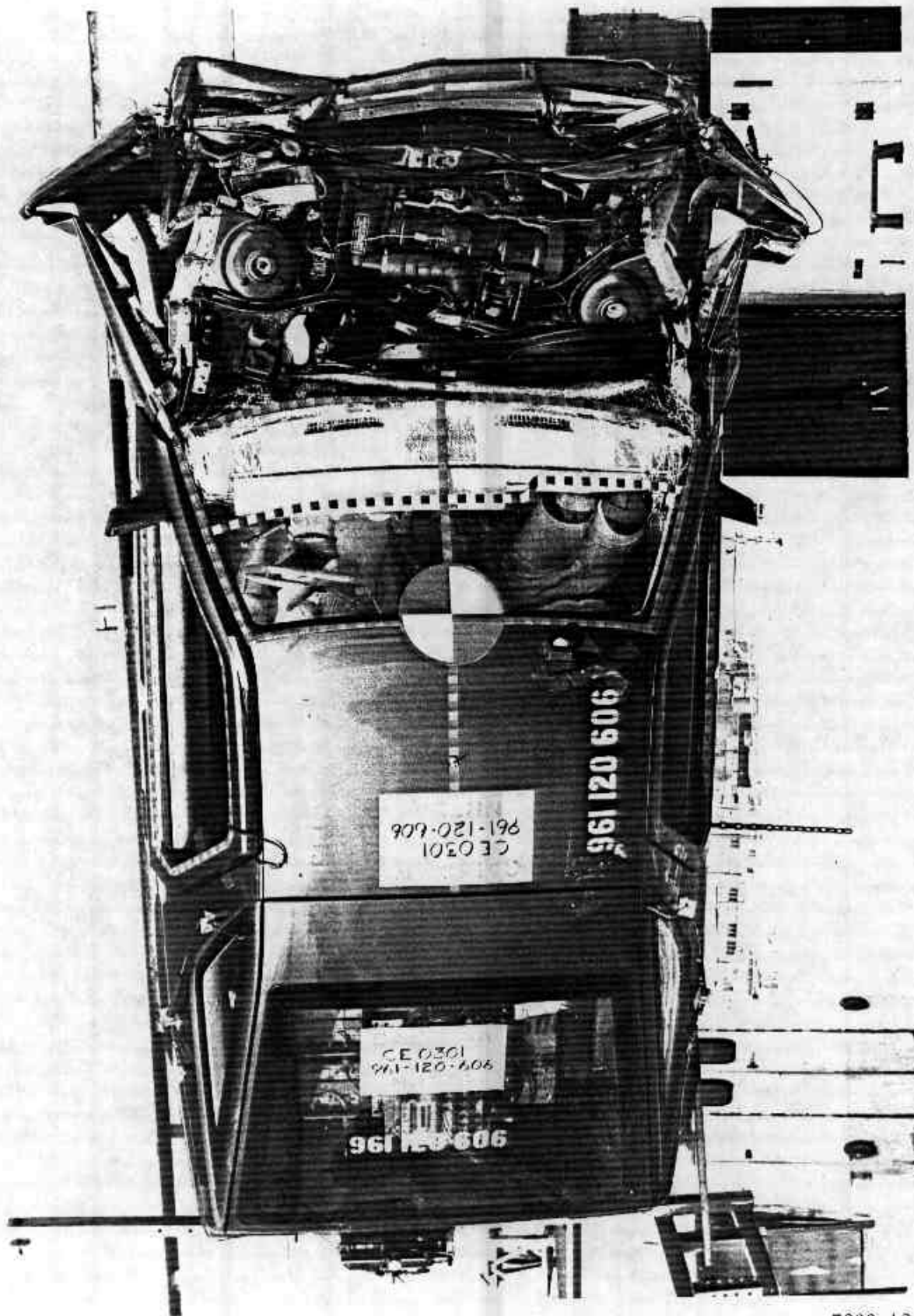


Figure A-11 POST-TEST TOP VIEW

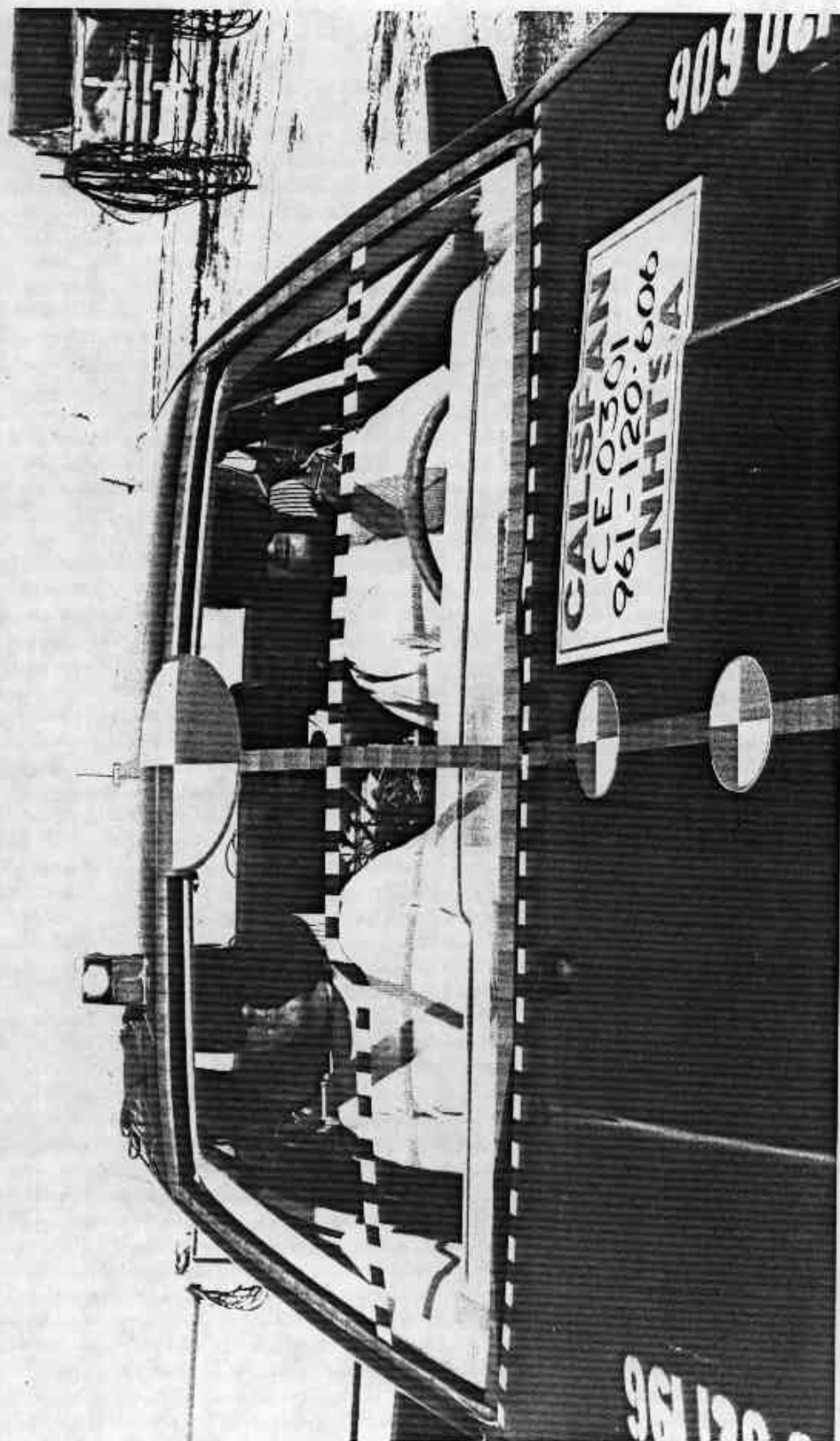


Figure A-12 PRE-TEST WINDSHIELD VIEW

A-13

7209-12

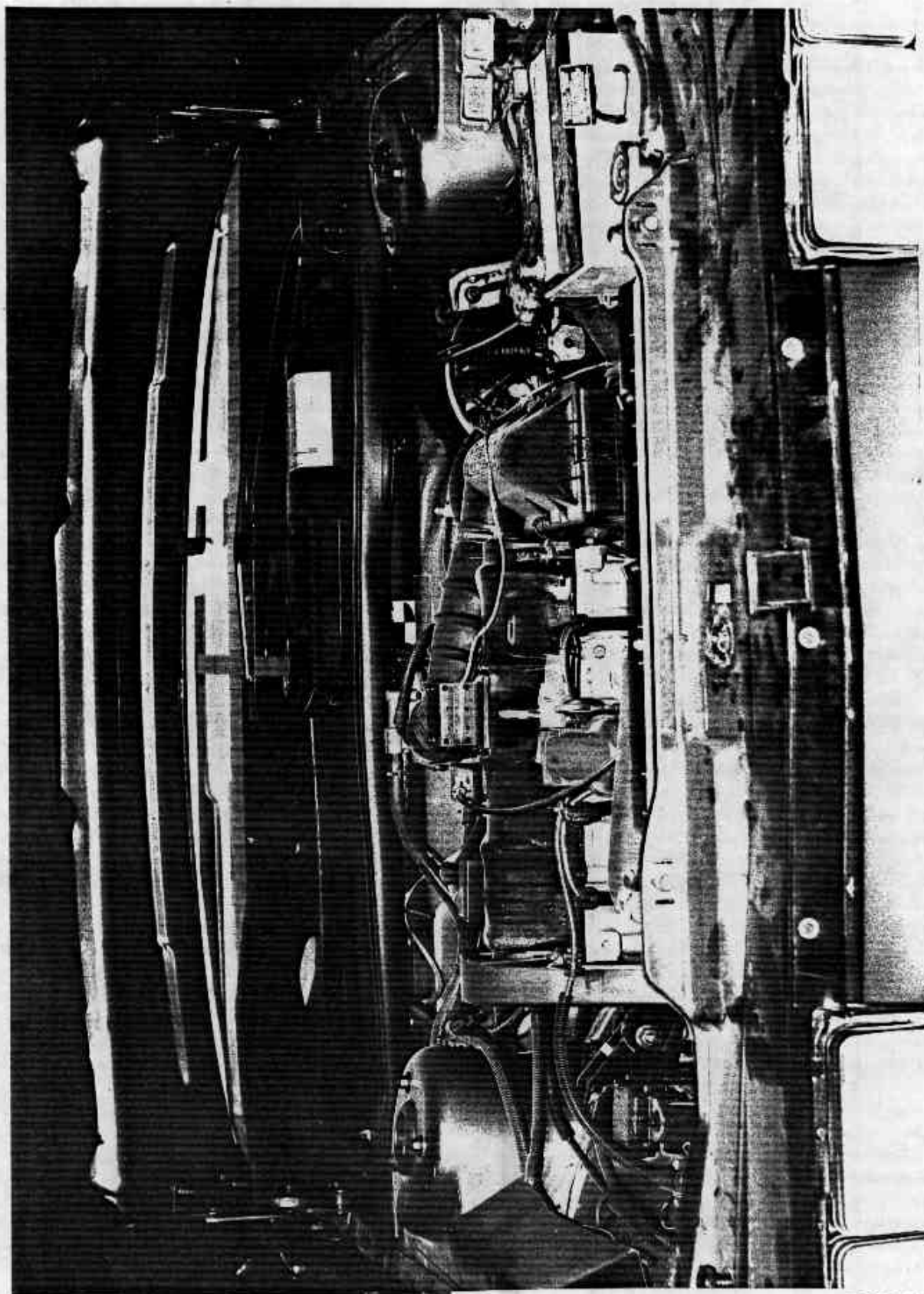


Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

A-14

7209-12

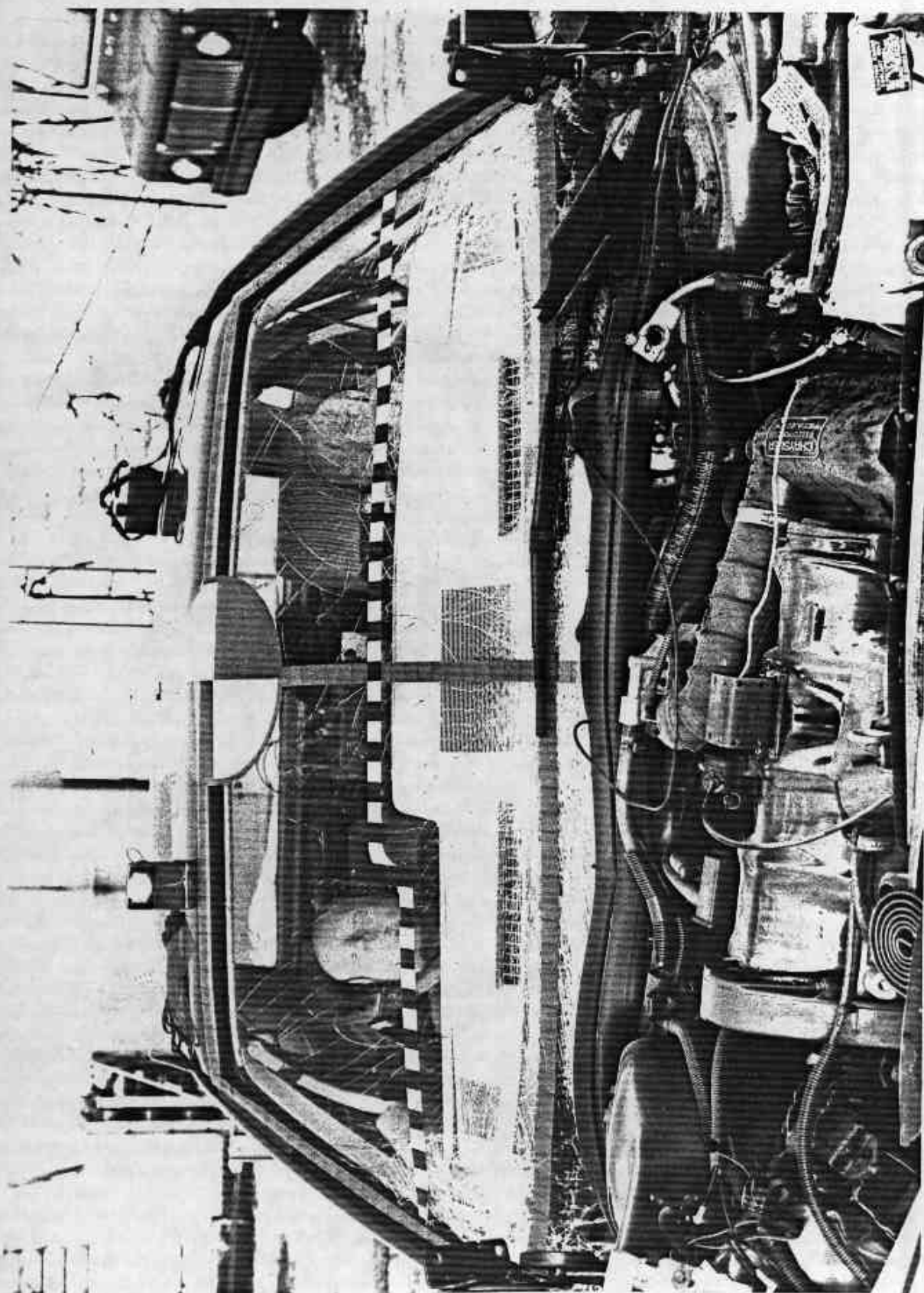


Figure A-14 POST-TEST WINDSHIELD AND ENGINE COMPARTMENT VIEW

A-15

7209-12

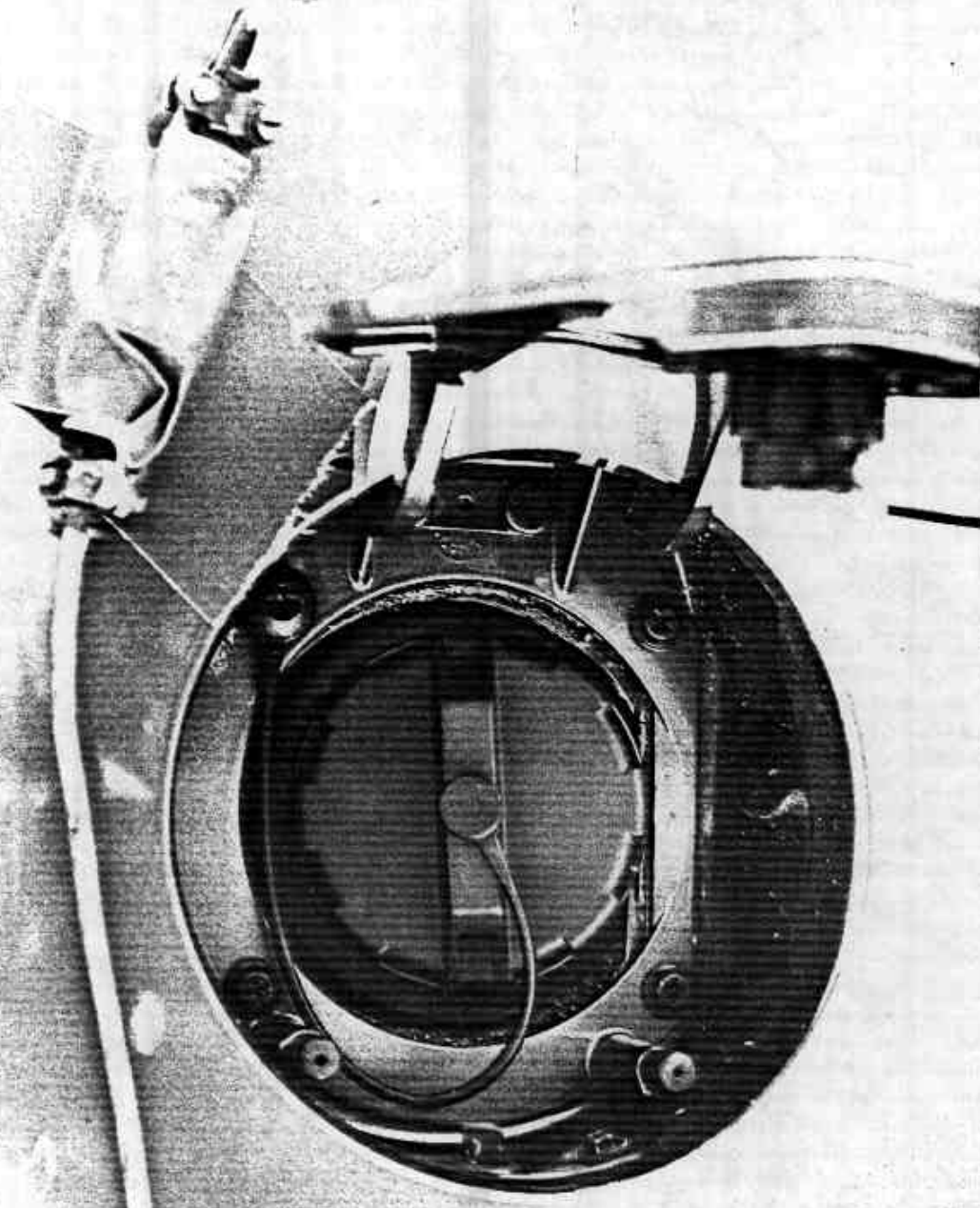


Figure A-15 PRE-TEST FILLER CAP VIEW

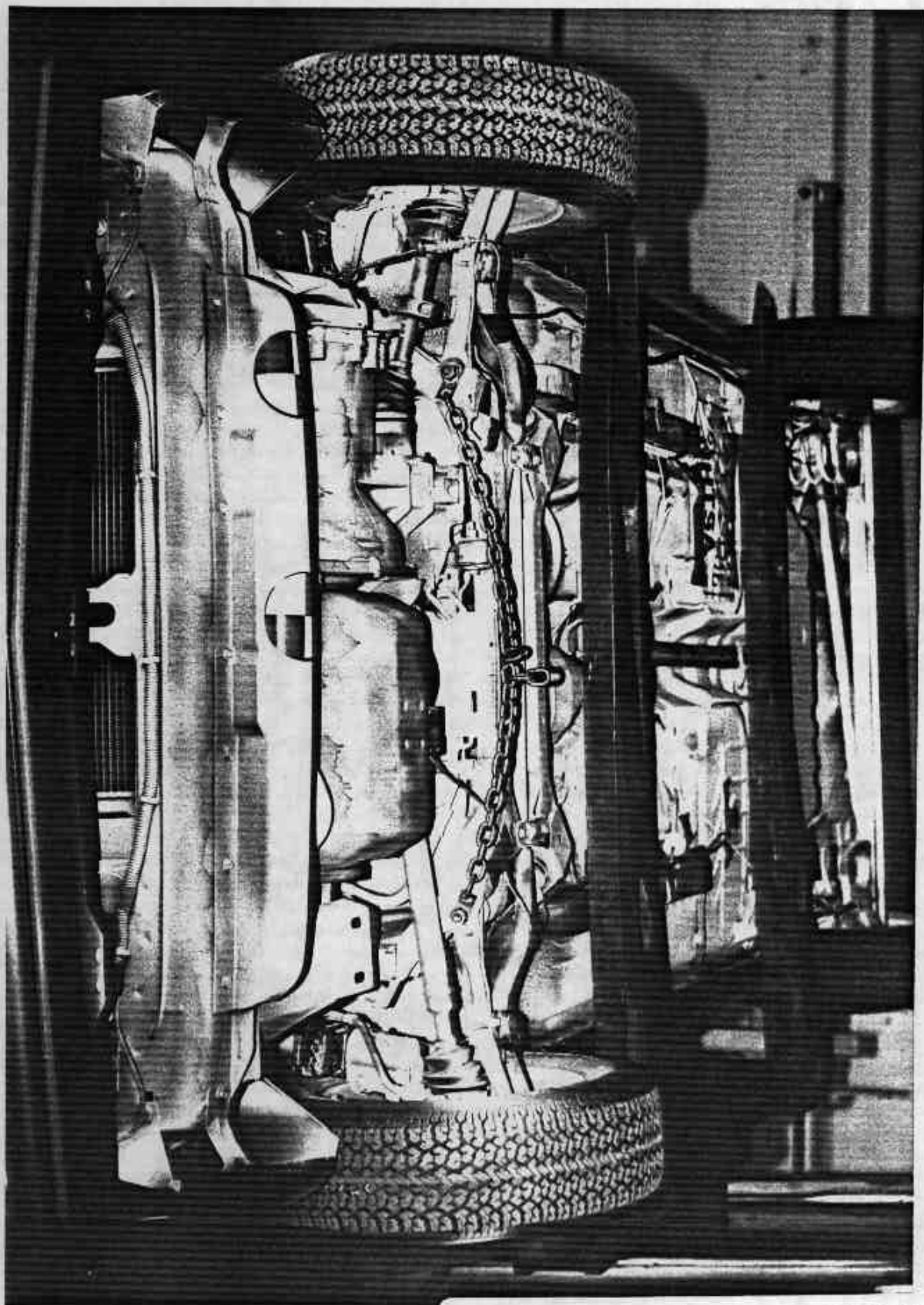


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

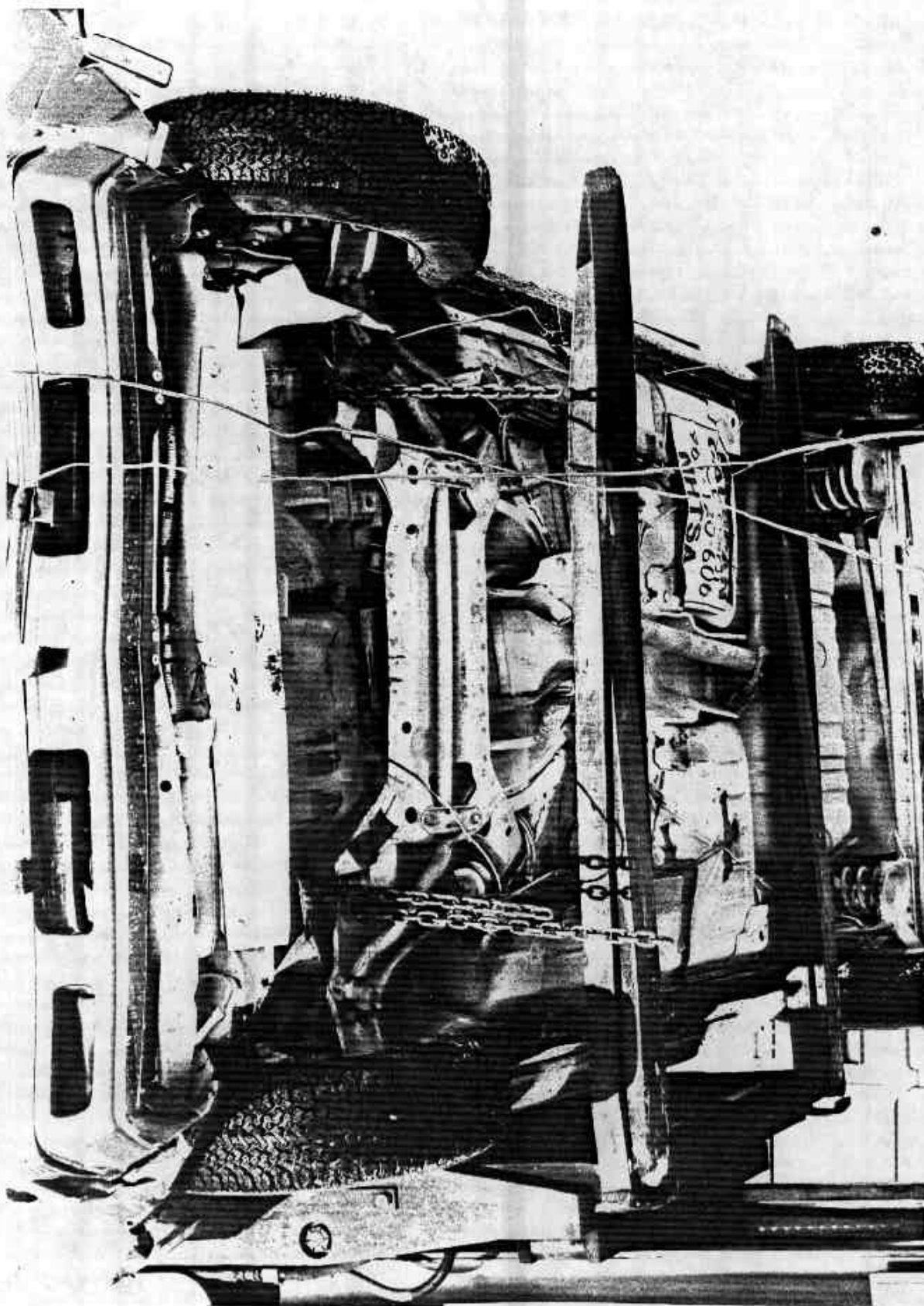


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

A-18

7209-12

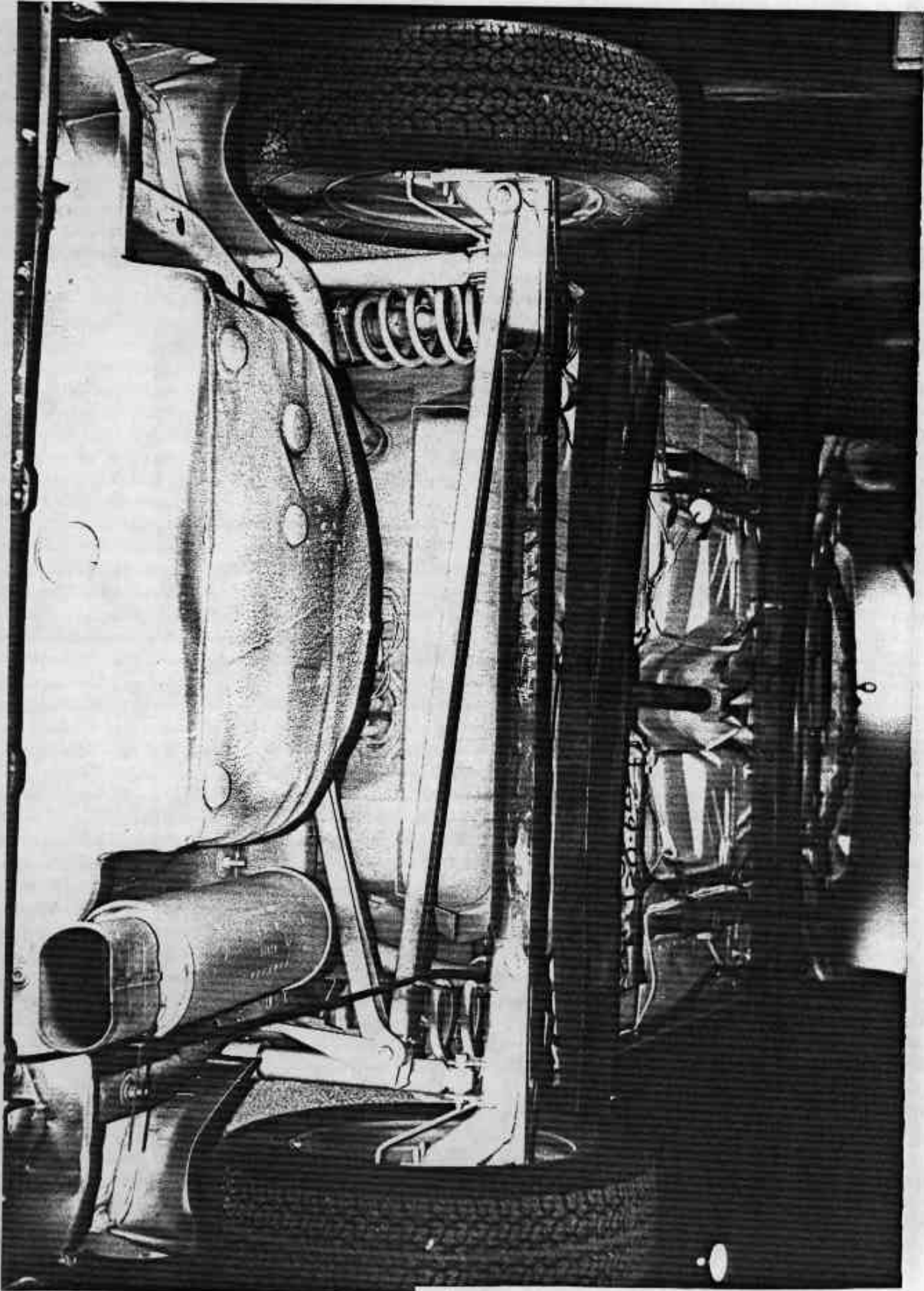


Figure A-18 PRE-TEST REAR UNDERBODY VIEW

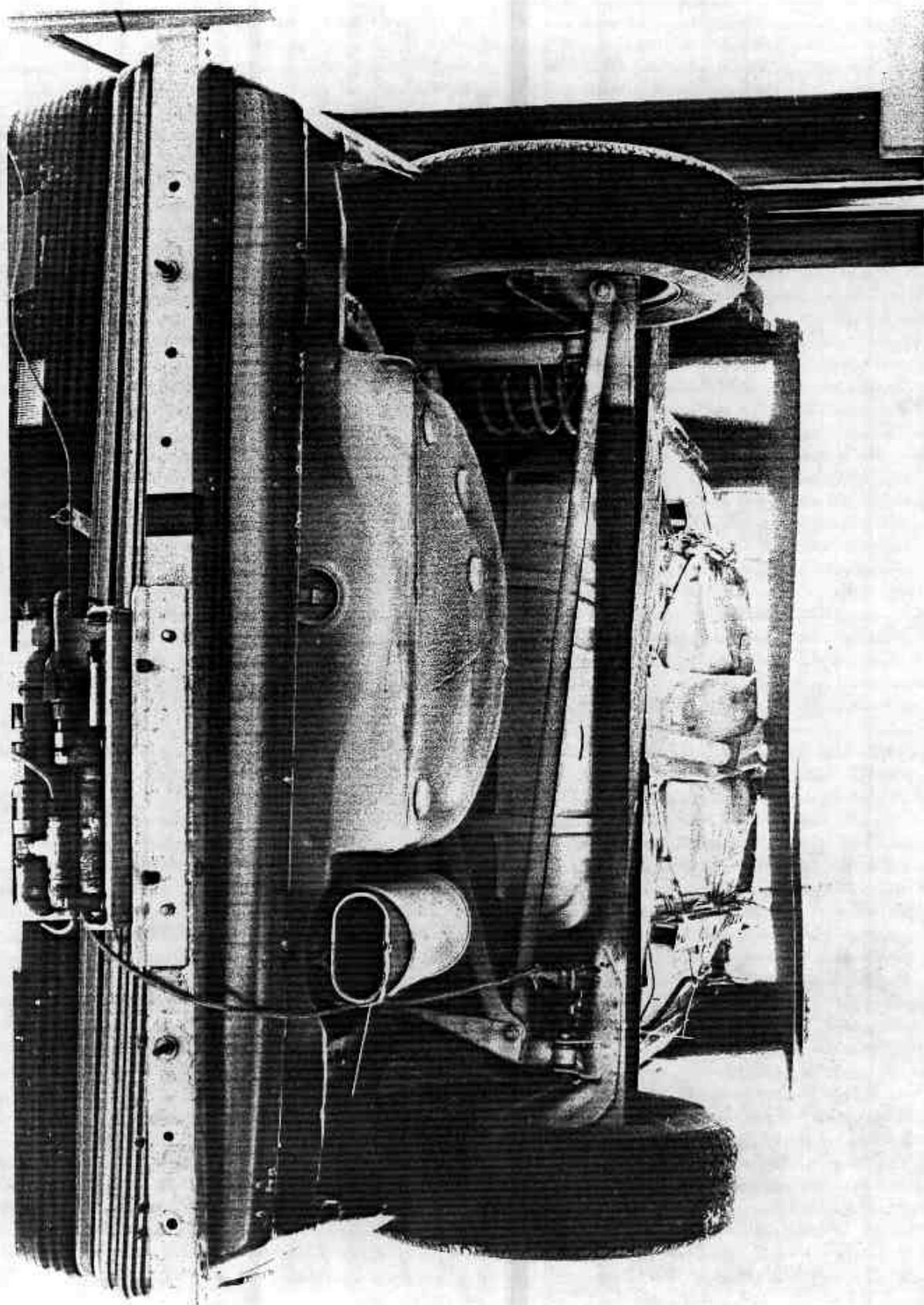


Figure A-19 POST-TEST REAR UNDERBODY VIEW

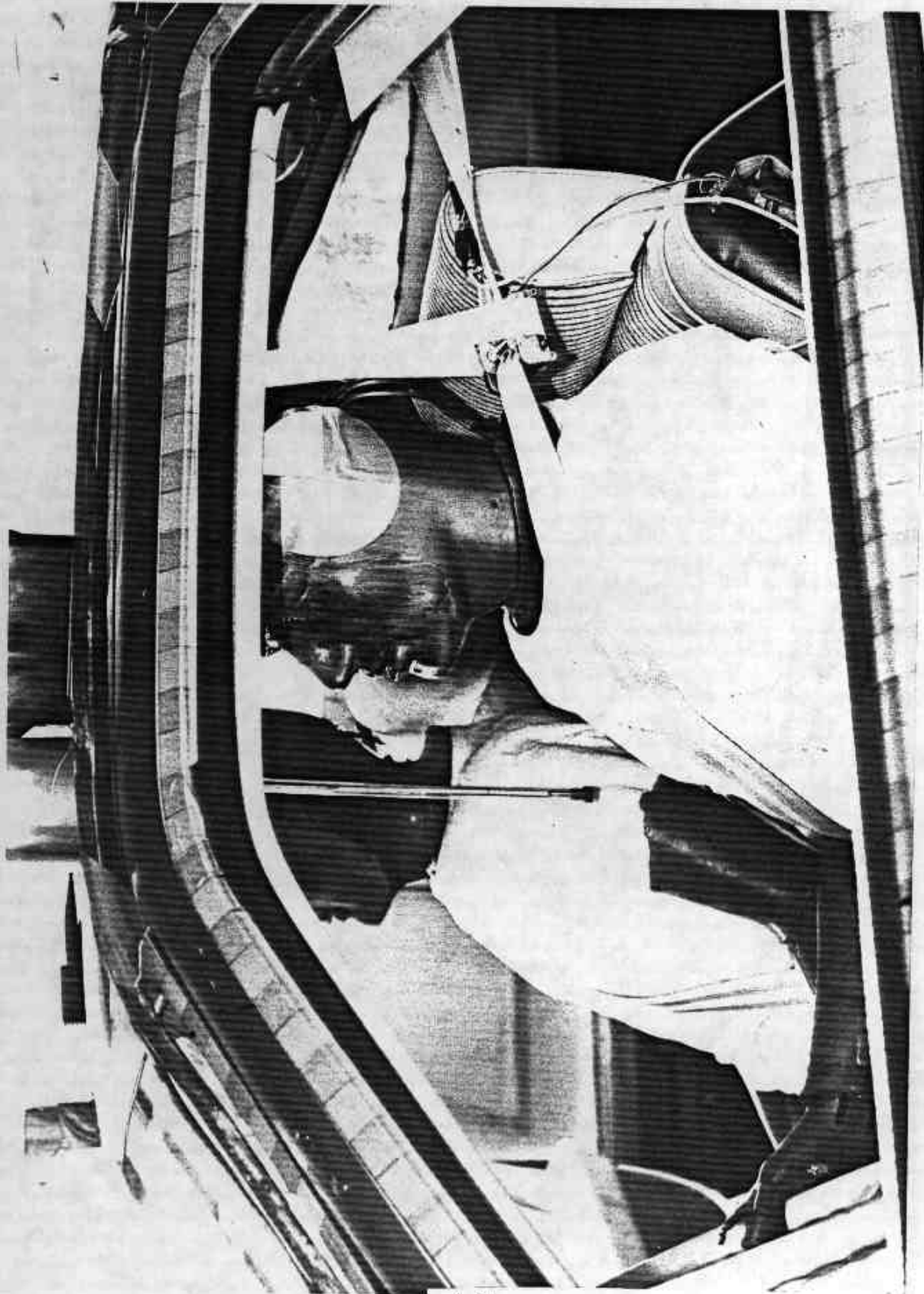


Figure A-20 PRE-TEST DRIVER POSITION VIEW

A-21

7209-12



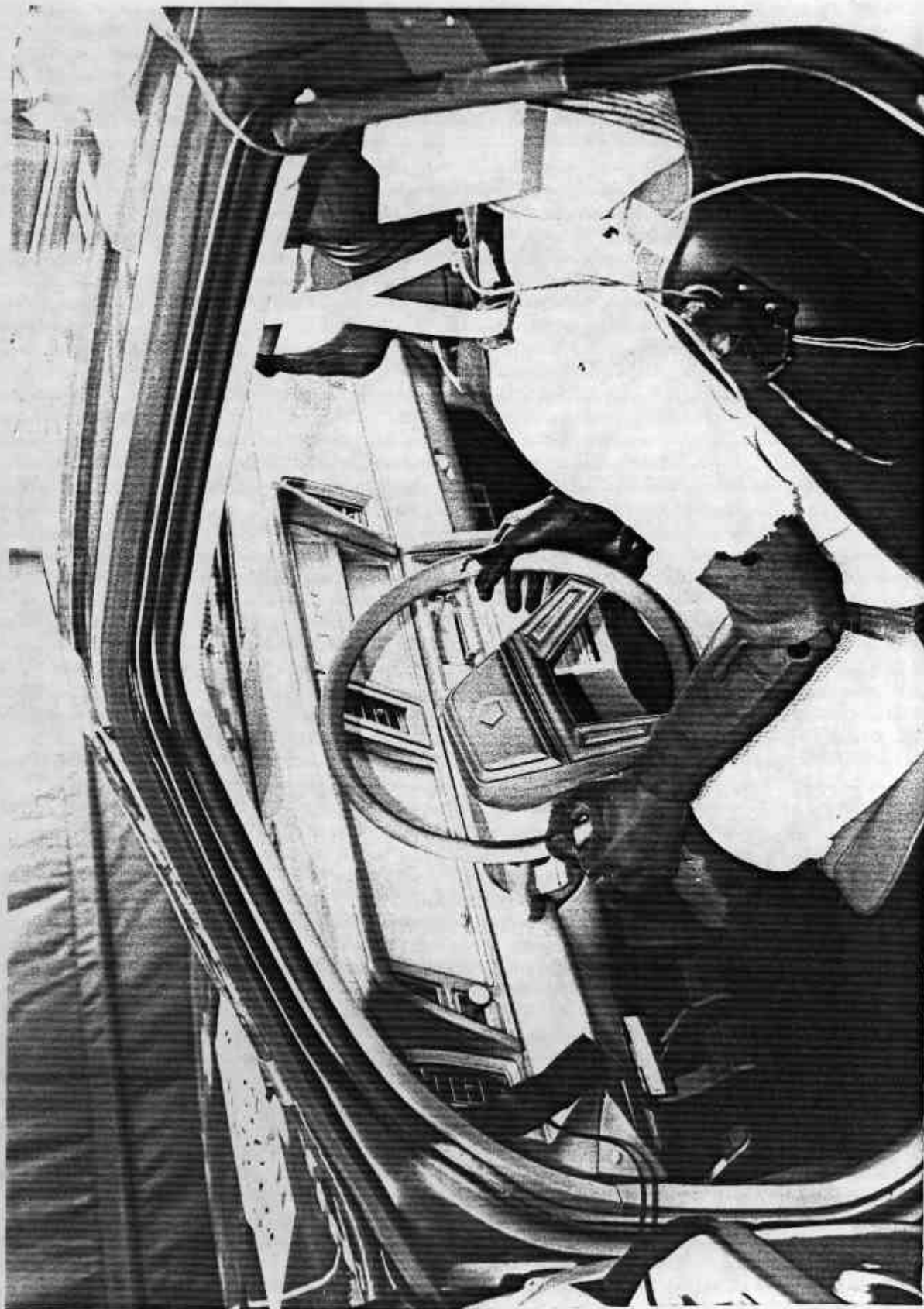


Figure A-22 DRIVER AND INTERIOR VIEW

A-23

7209-12

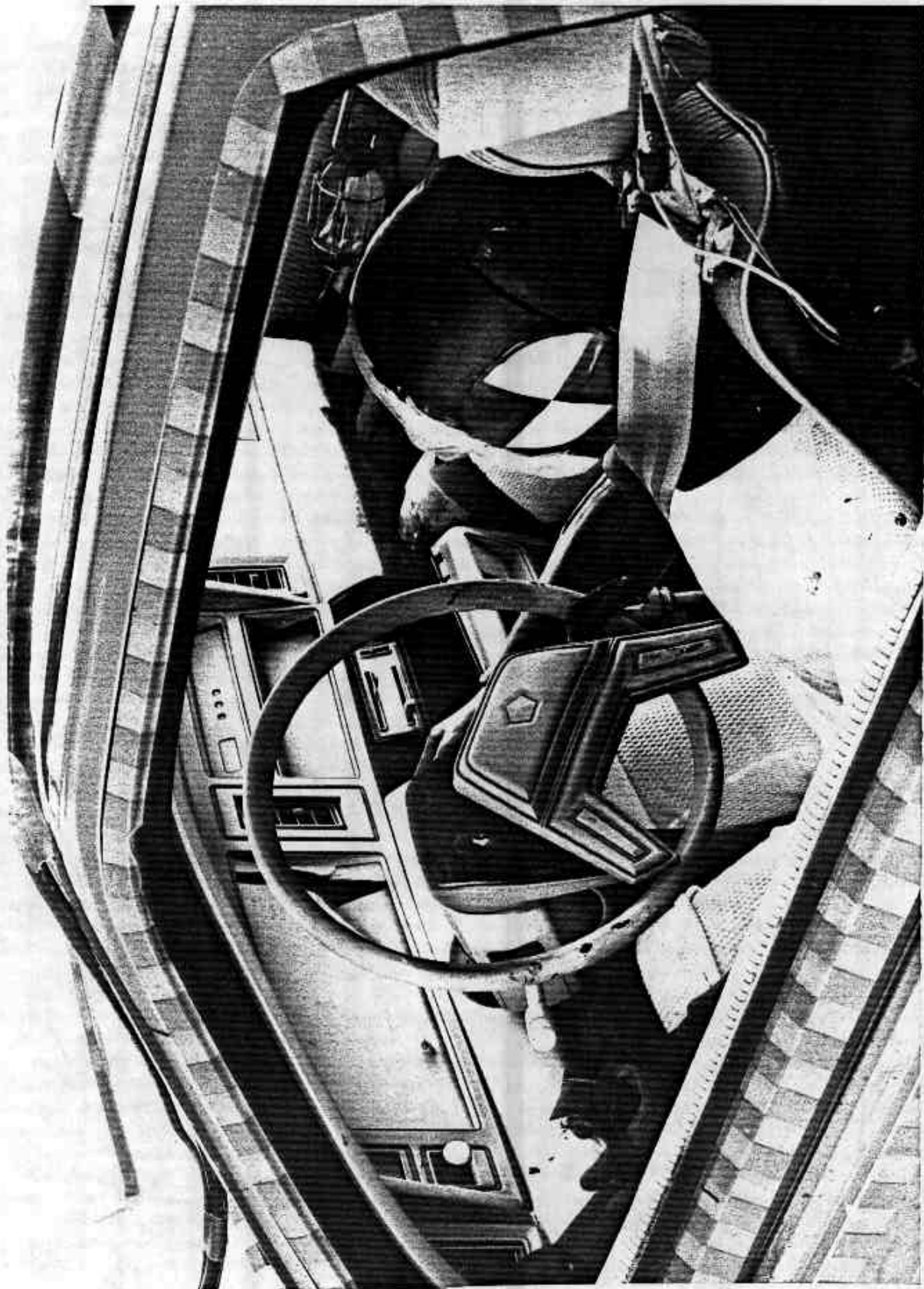


Figure A-23 POST-TEST DRIVER AND INTERIOR VIEW

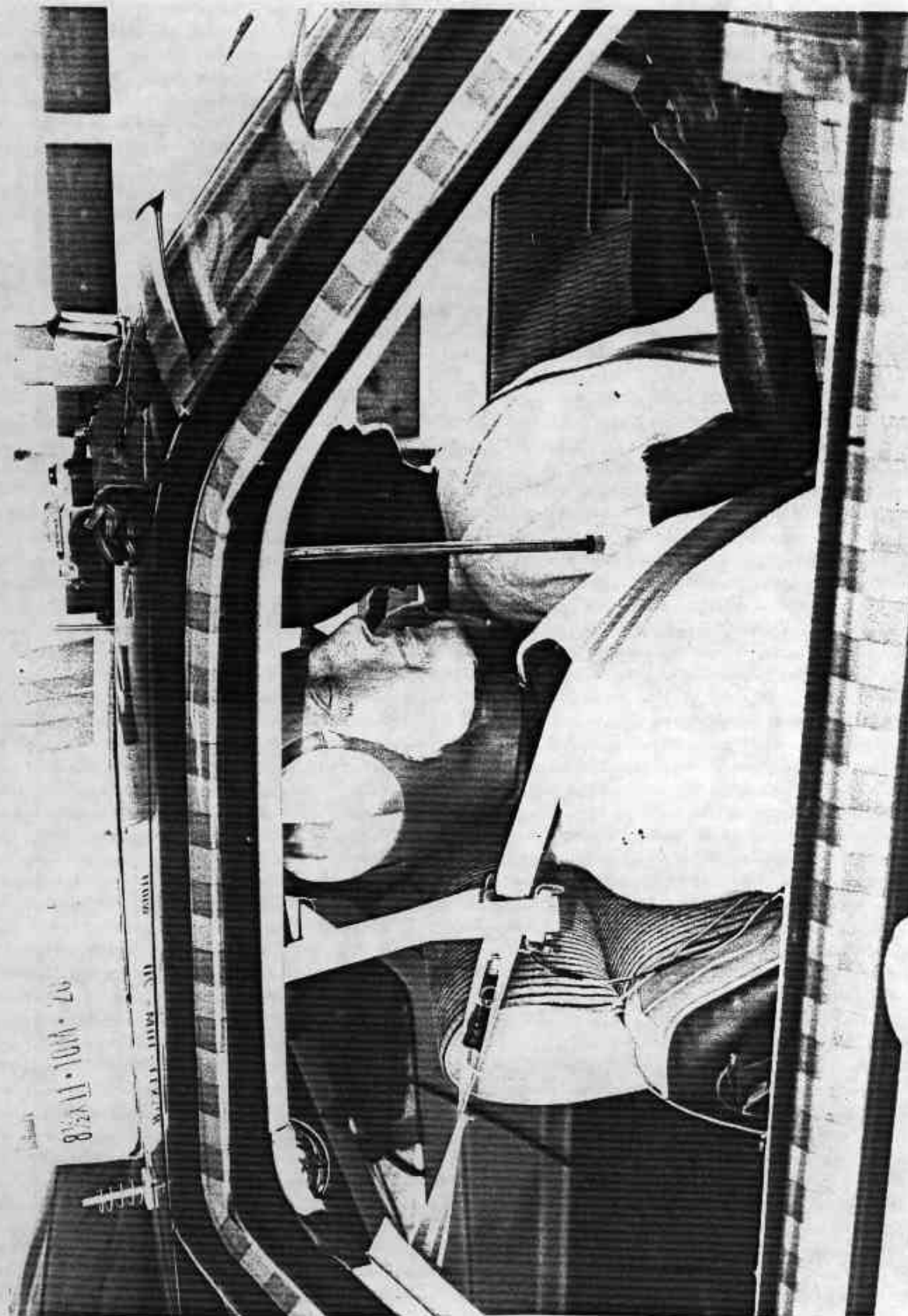


Figure A-24 PRE-TEST PASSENGER POSITION VIEW

A-25

7209-12



A-26

7209-12

Figure A-25 POST-TEST PASSENGER POSITION VIEW



Figure A-26 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-27 POST-TEST PASSENGER AND INTERIOR VIEW

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA

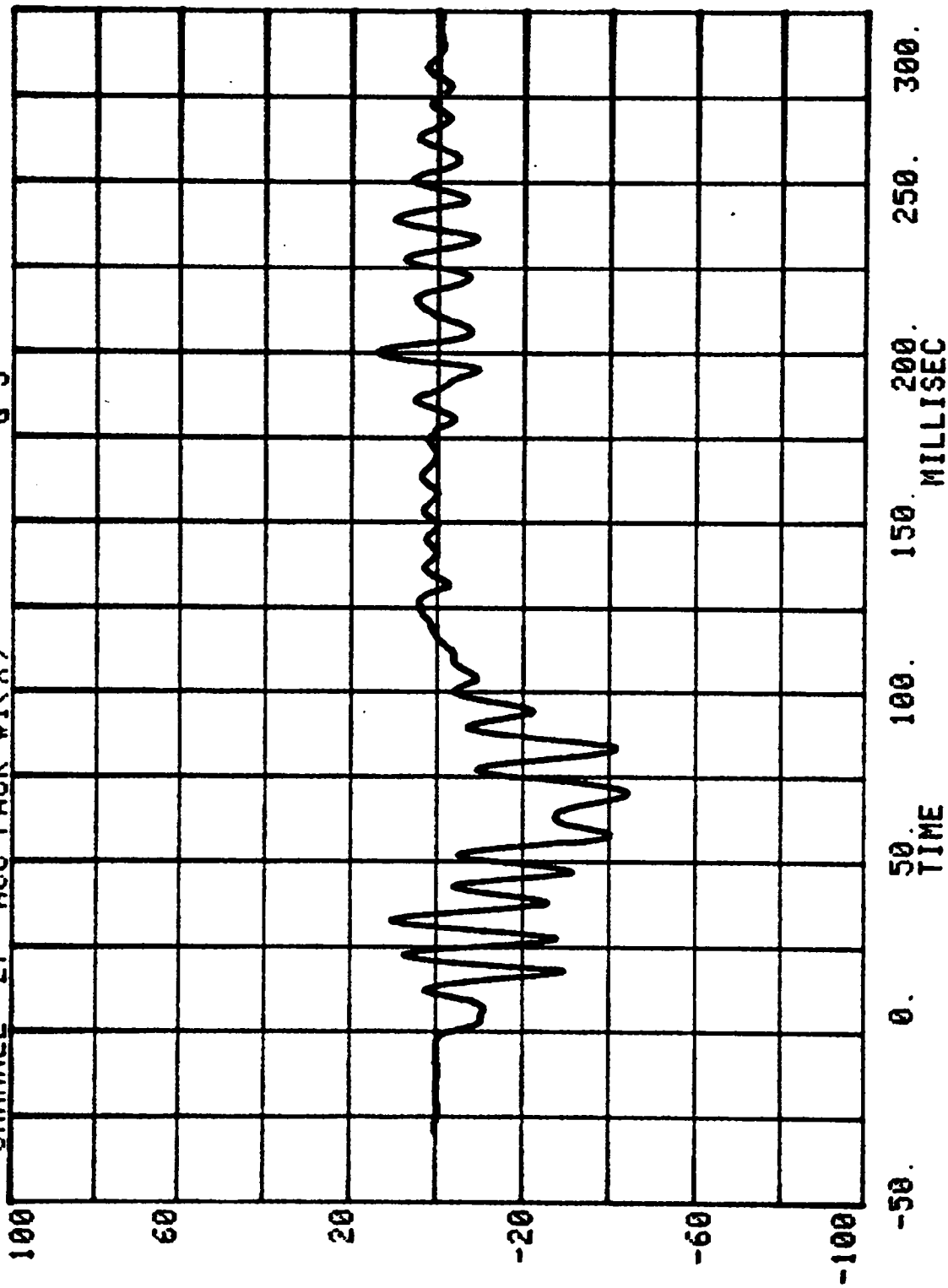
TEST NO. CE0301

VEHICLE DATA

FILTER CHANNEL CLASS

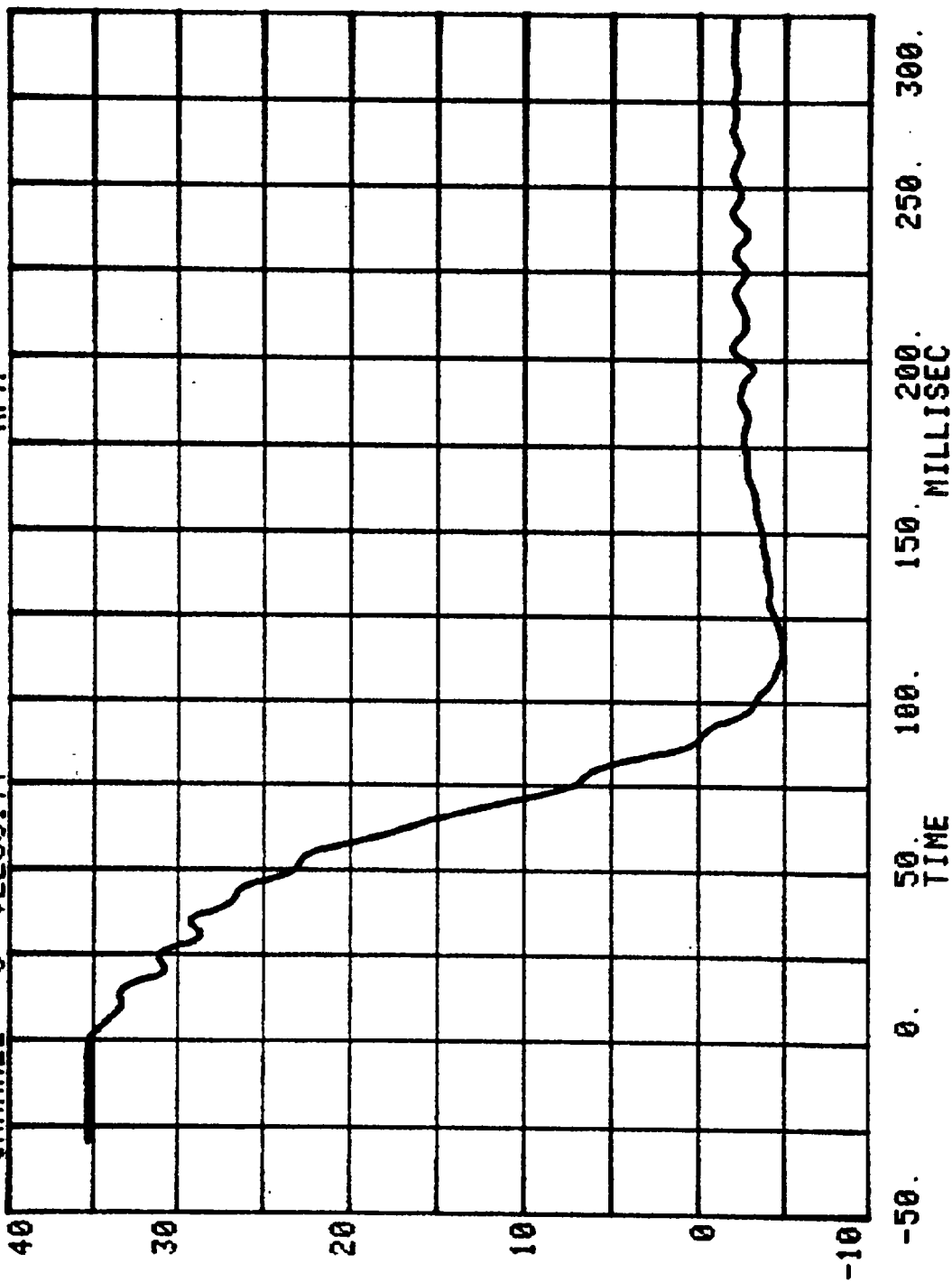
60

CHANNEL 27 ACC PACK #1(X) RUN= 606 SERIES= 301 G'S



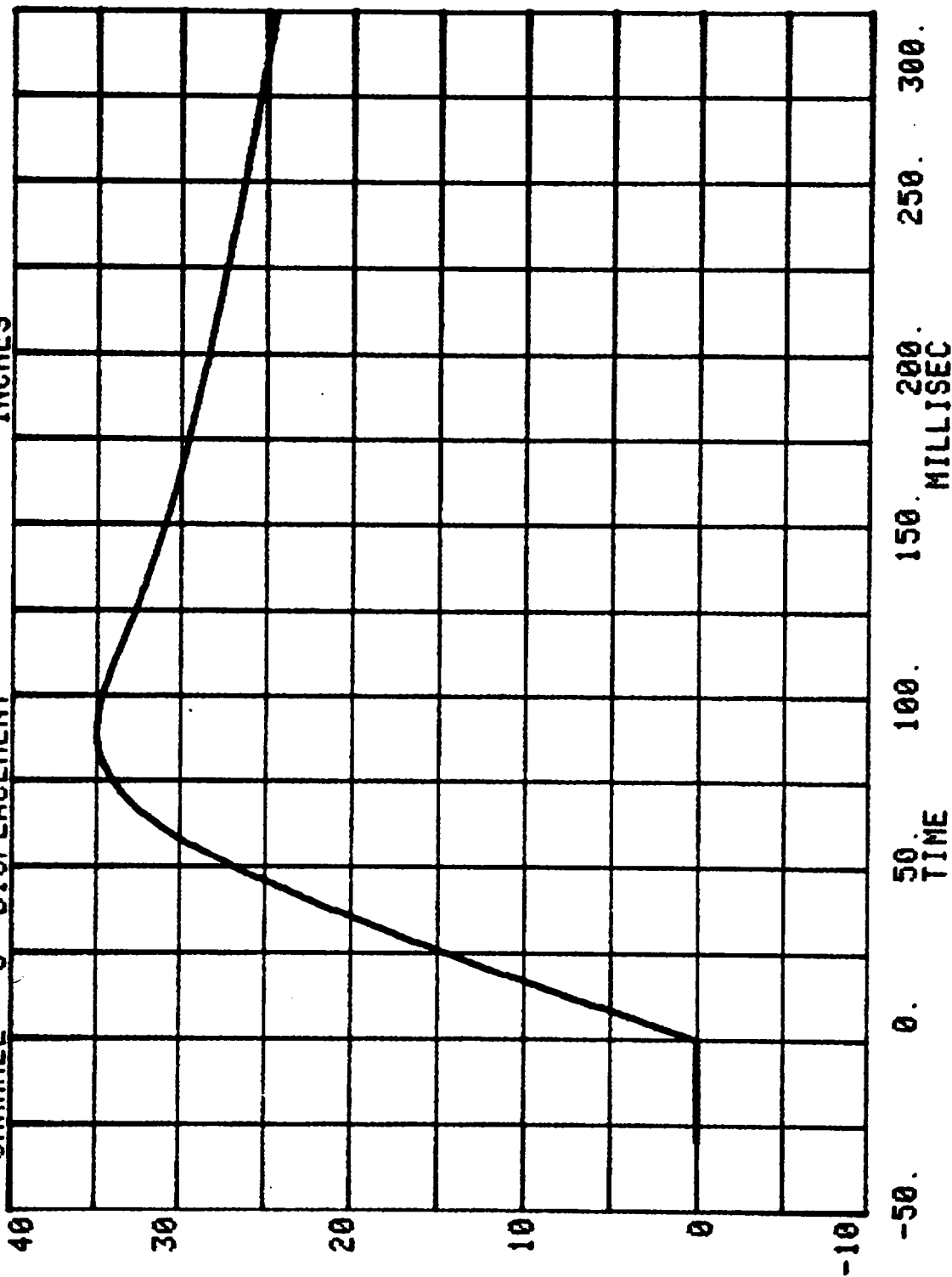
ACC. PACK. #1(X)

CHANNEL 5 VELOCITY
RUN= 606 SERIES= 301 MPH

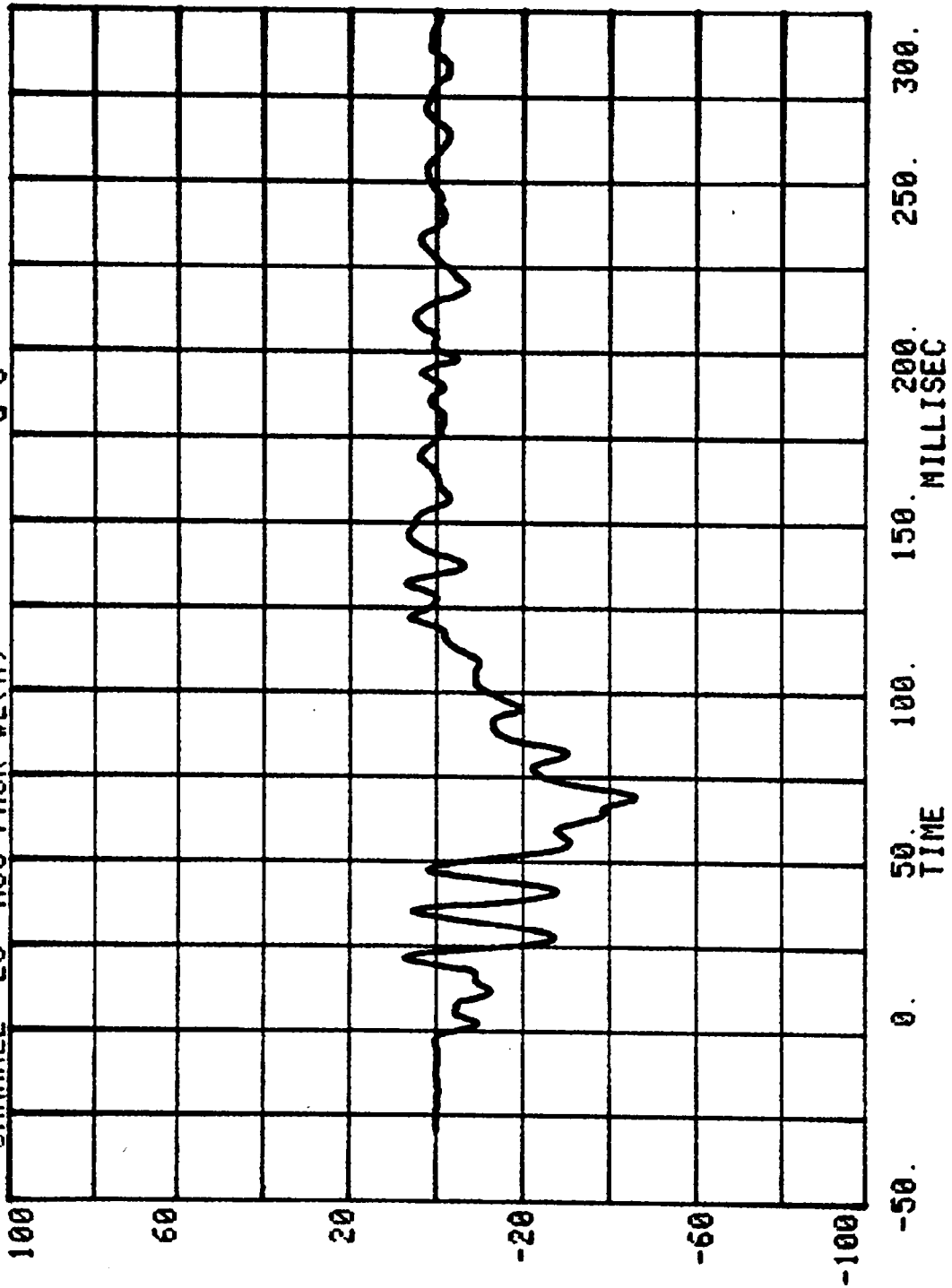


ACC. PACK. #1(X)

CHANNEL 6 DISPLACEMENT
RUN= 606 SERIES= 301 INCHES

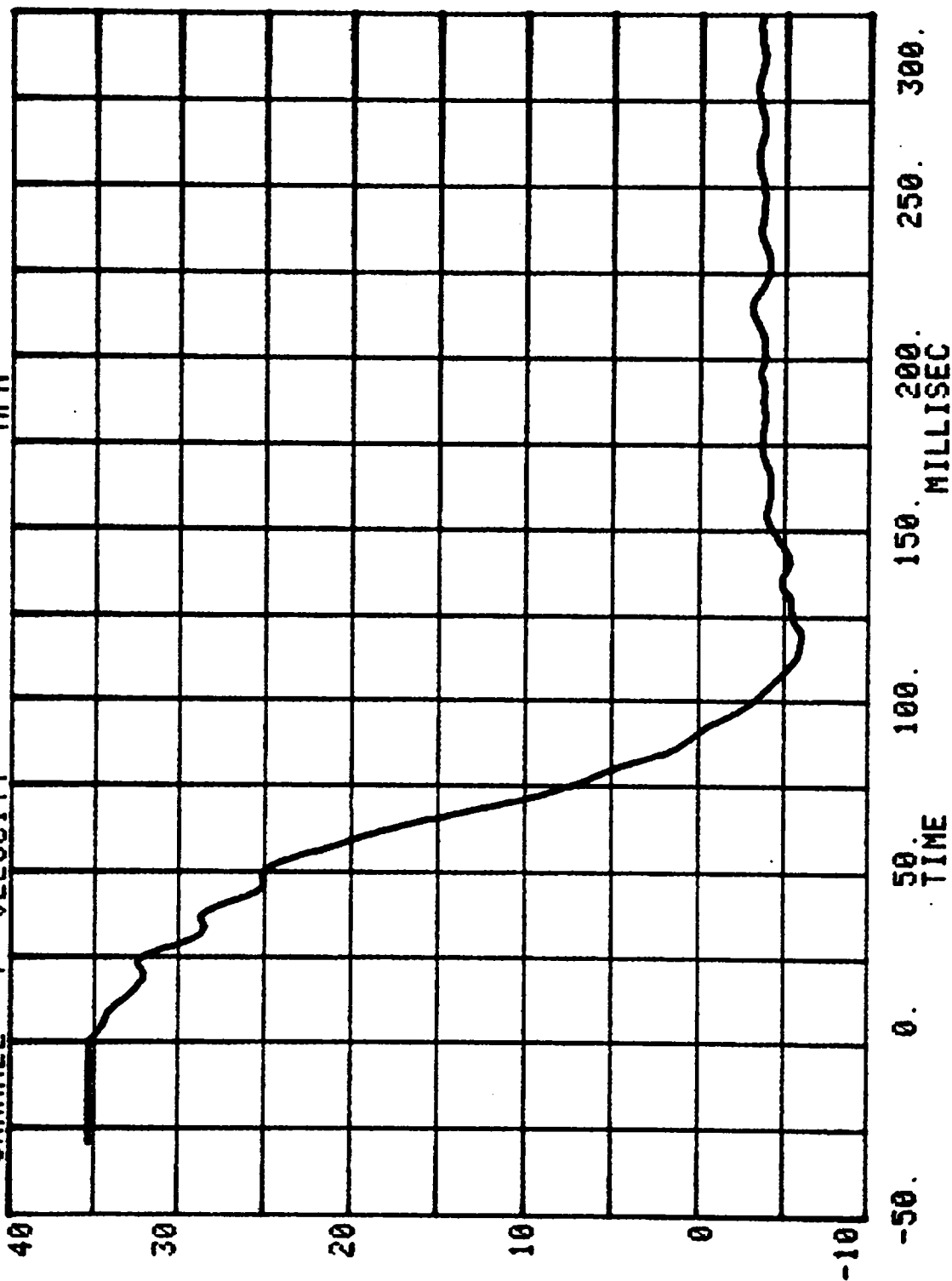


CHANNEL 28 ACC PACK #2(X) RUN= 606 SERIES= 301 G'S



ACC. PACK. #2(X)

RUN= 606 SERIES= 301
CHANNEL 7 VELOCITY MPH

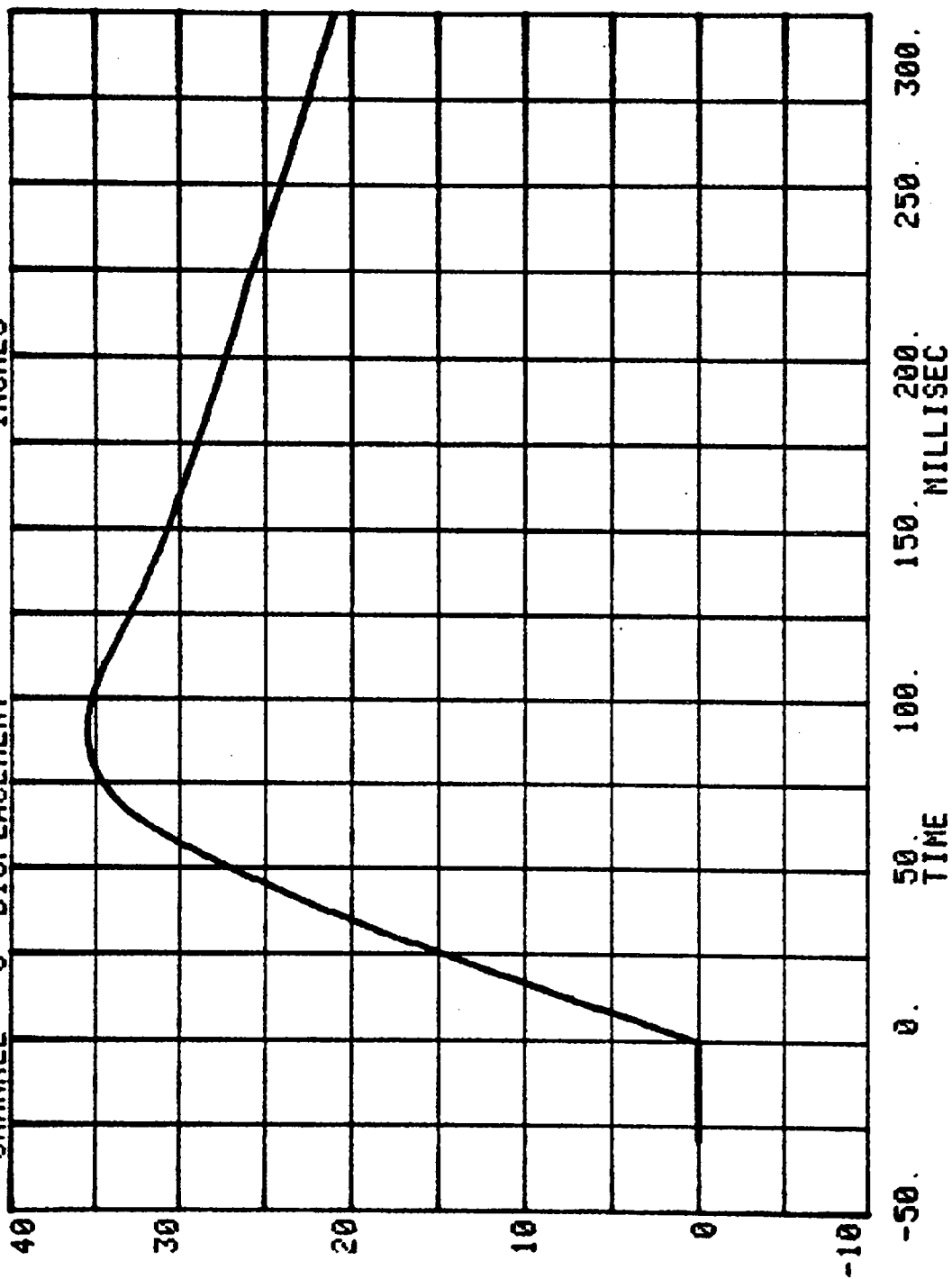


ACC. PACK. #2(X)

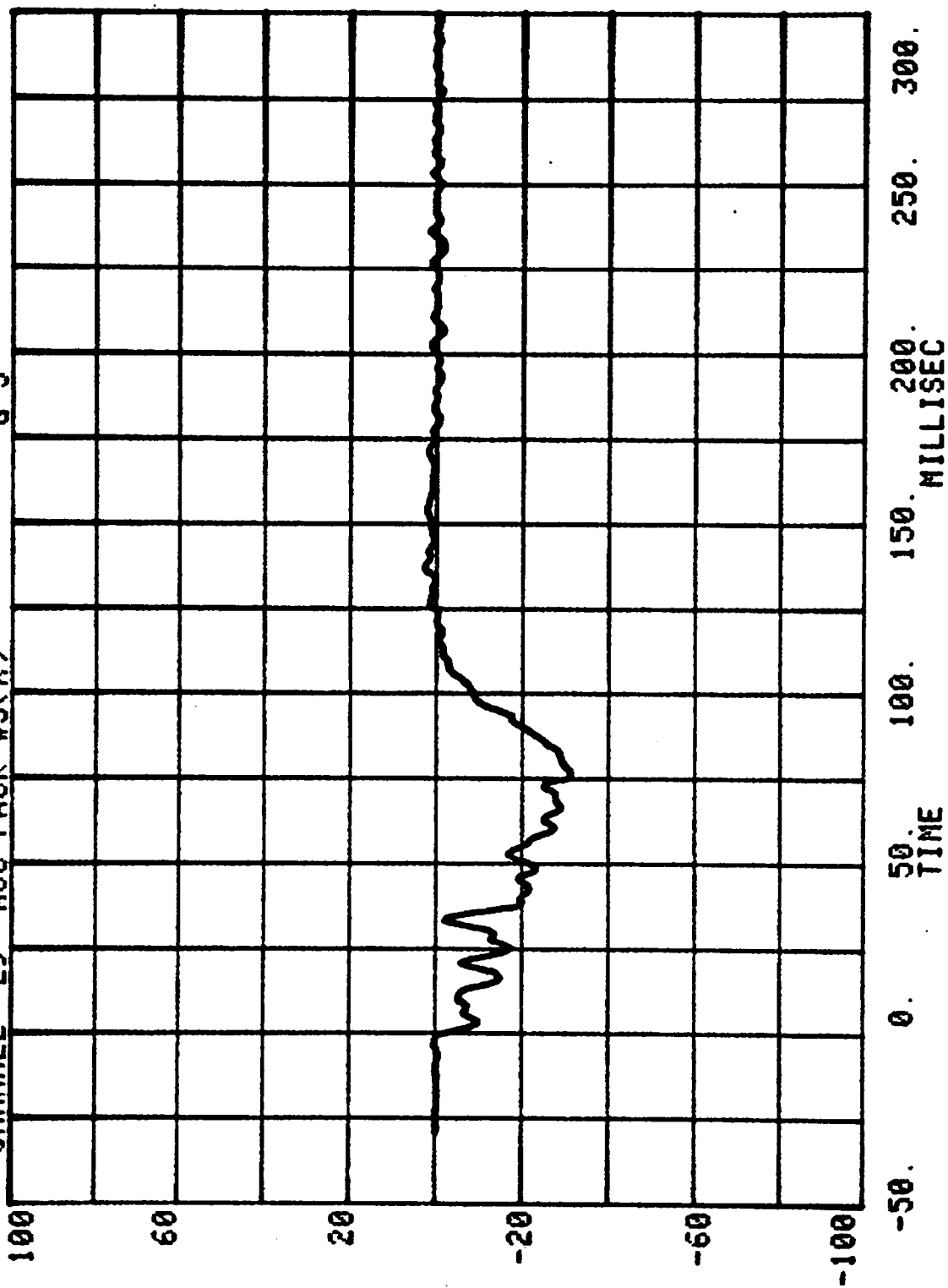
CHANNEL 8 DISPLACEMENT

RUN= 606 SERIES= 301

INCHES

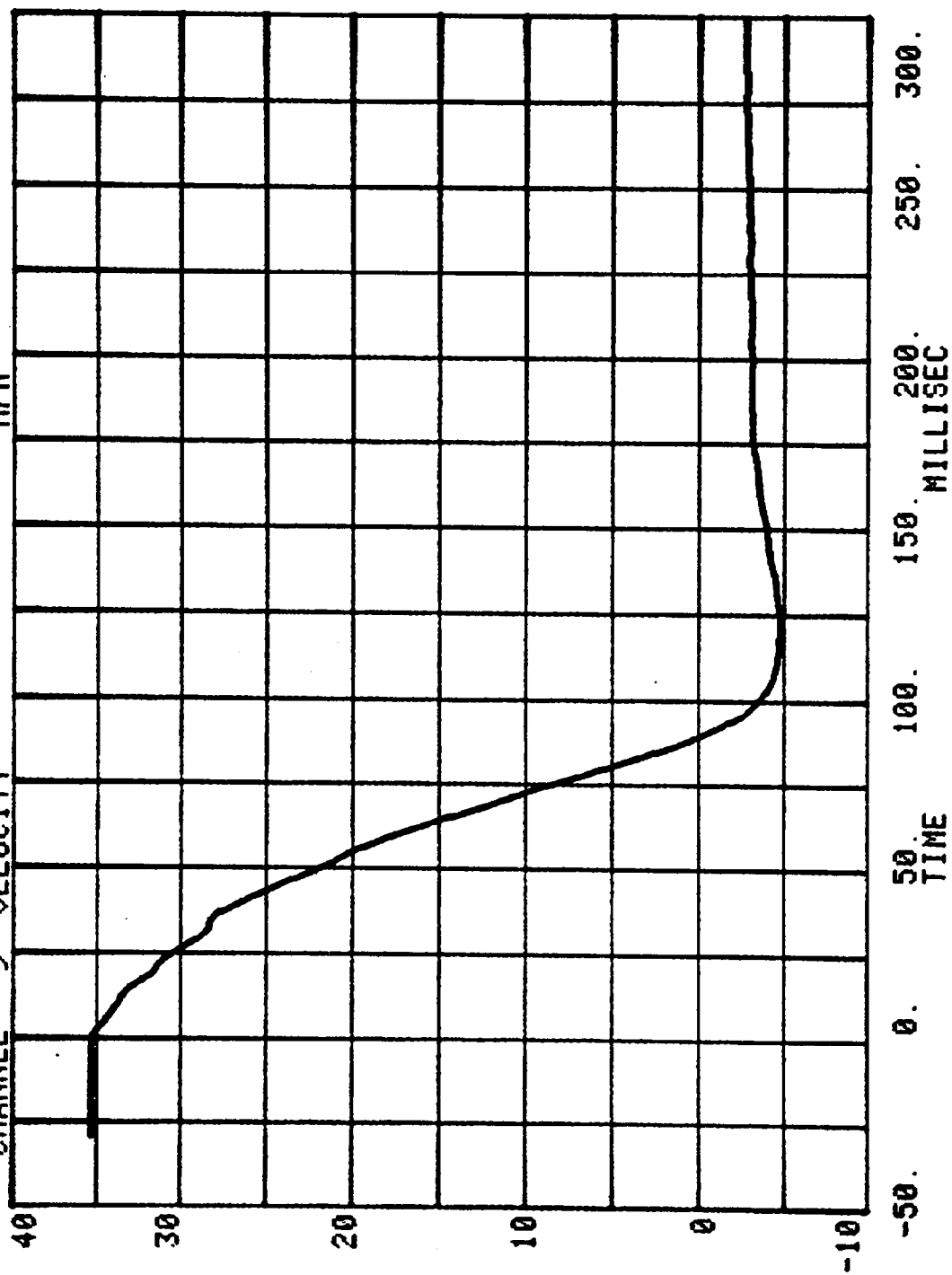


CHANNEL 29 ACC PACK #3(X) RUN= 606 SERIES= 301 G'S



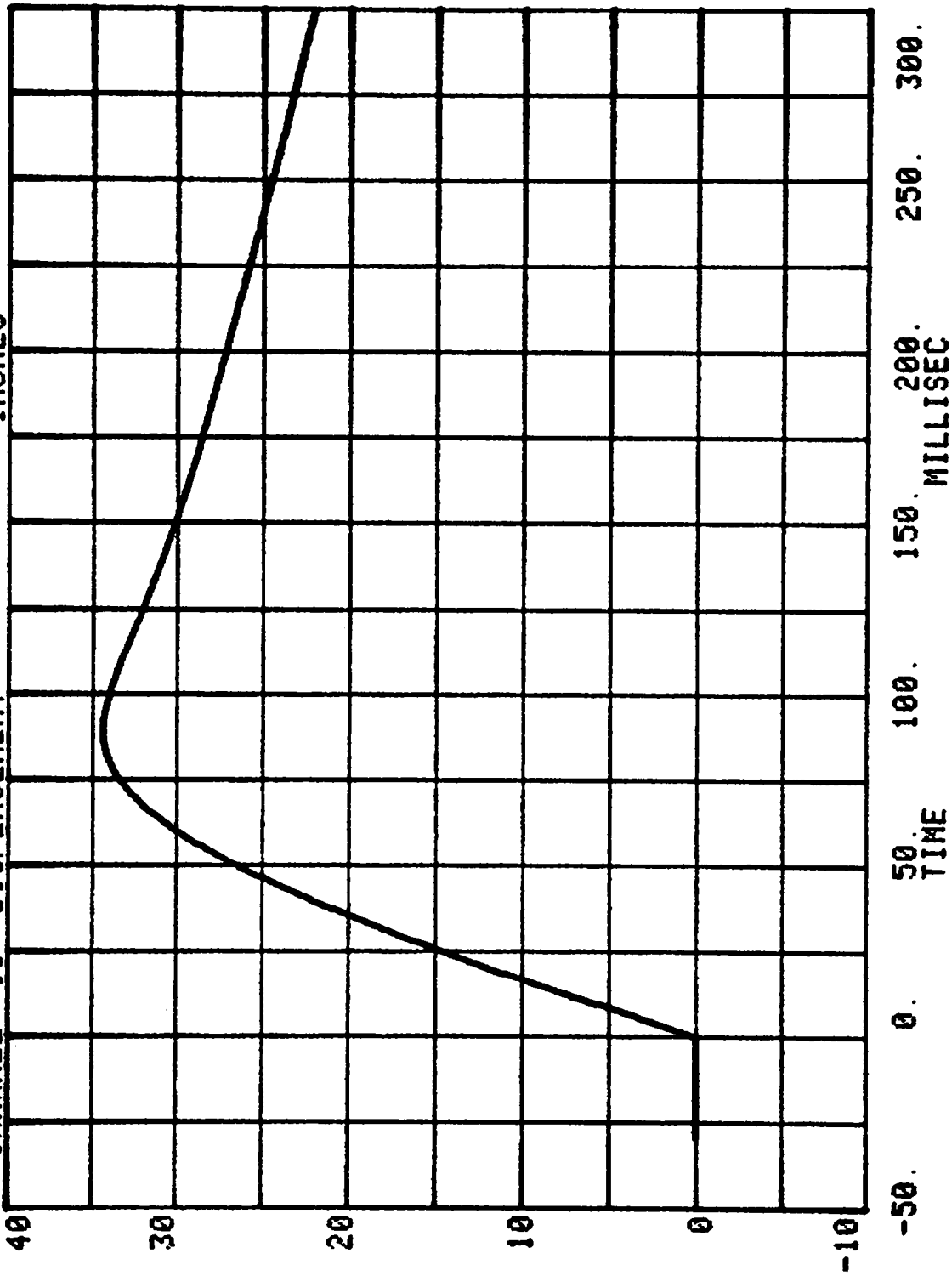
ACC. PACK. #3(X)

CHANNEL 9 VELOCITY
RUN= 606 SERIES= 301 MPH

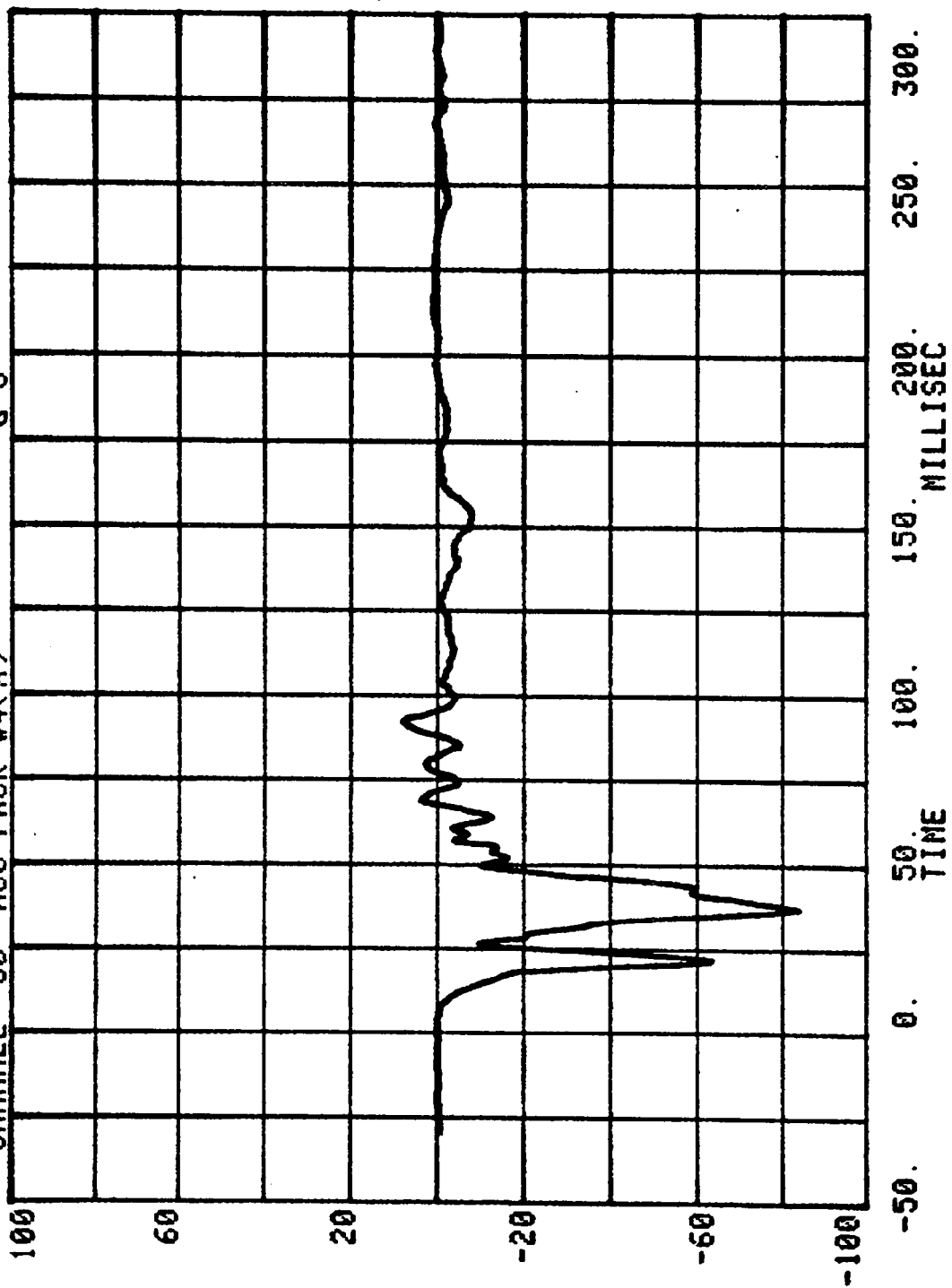


ACC. PACK. #3(X)

RUN= 606 SERIES= 301 INCHES
CHANNEL 10 DISPLACEMENT

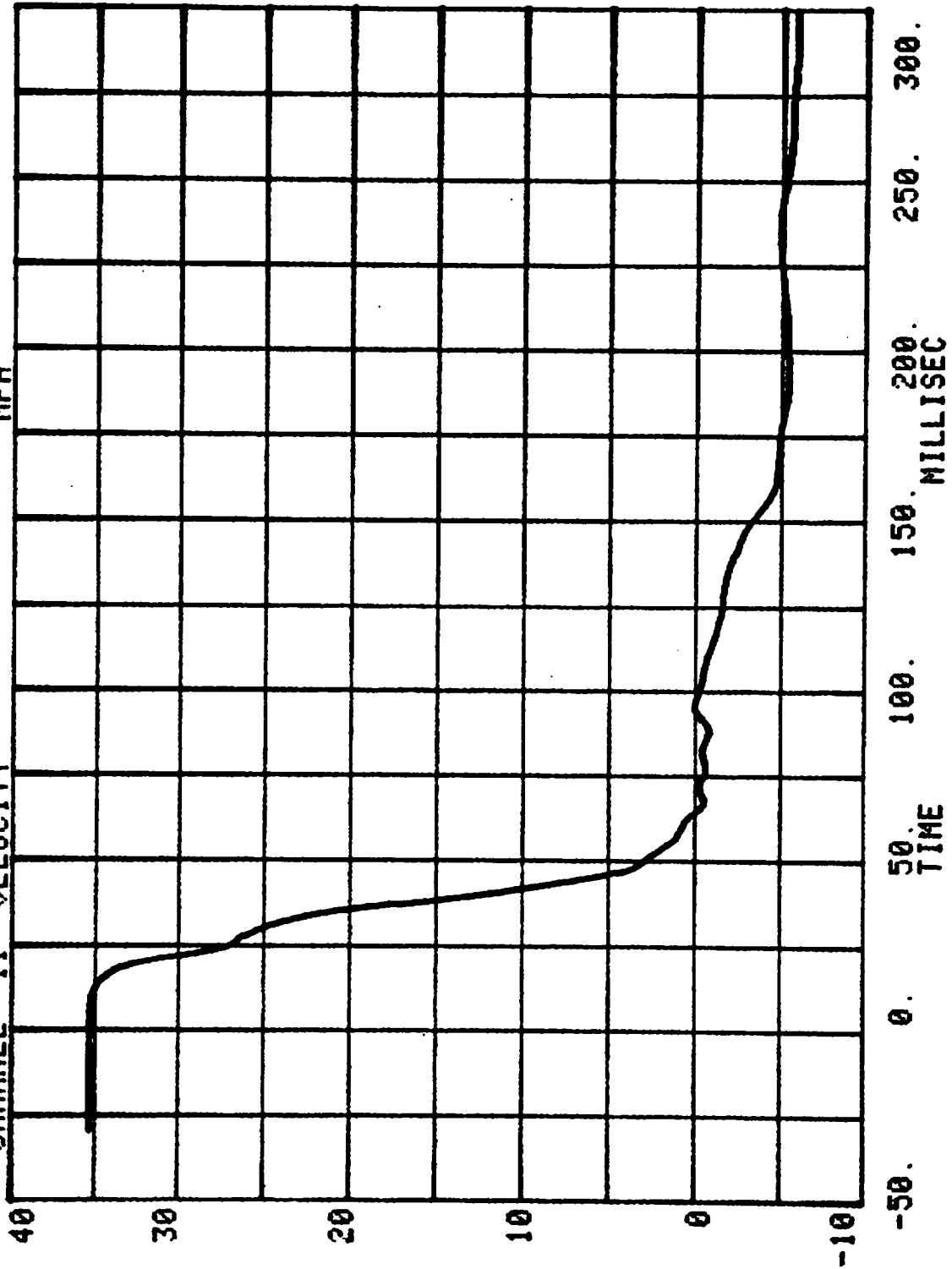


RUN= 606 SERIES= 301
CHANNEL 30 ACC PACK #4(X) G'S



ACC. PACK. #4(X)

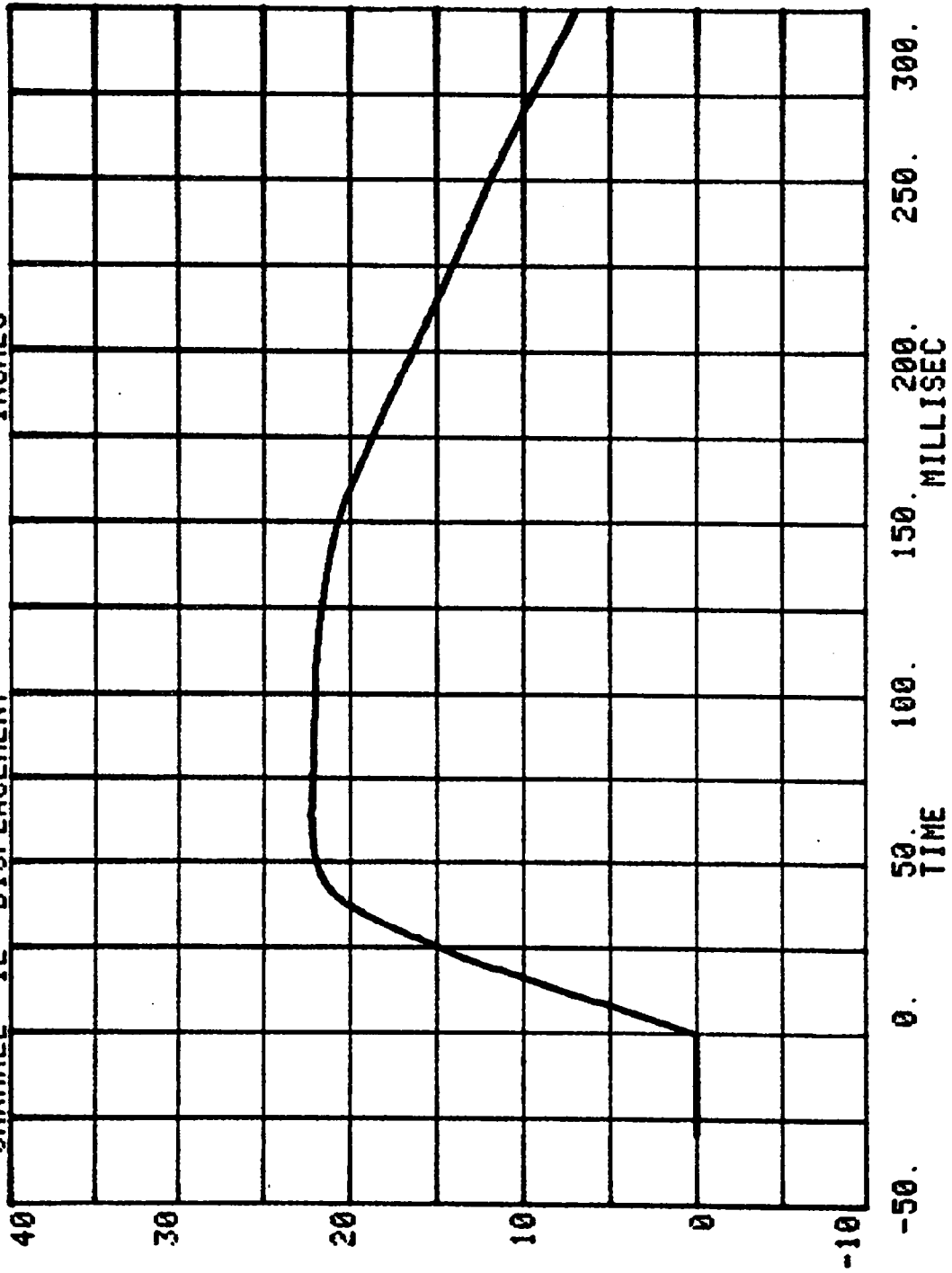
CHANNEL 11 VELOCITY
RUN= 606 SERIES= 301 MPH



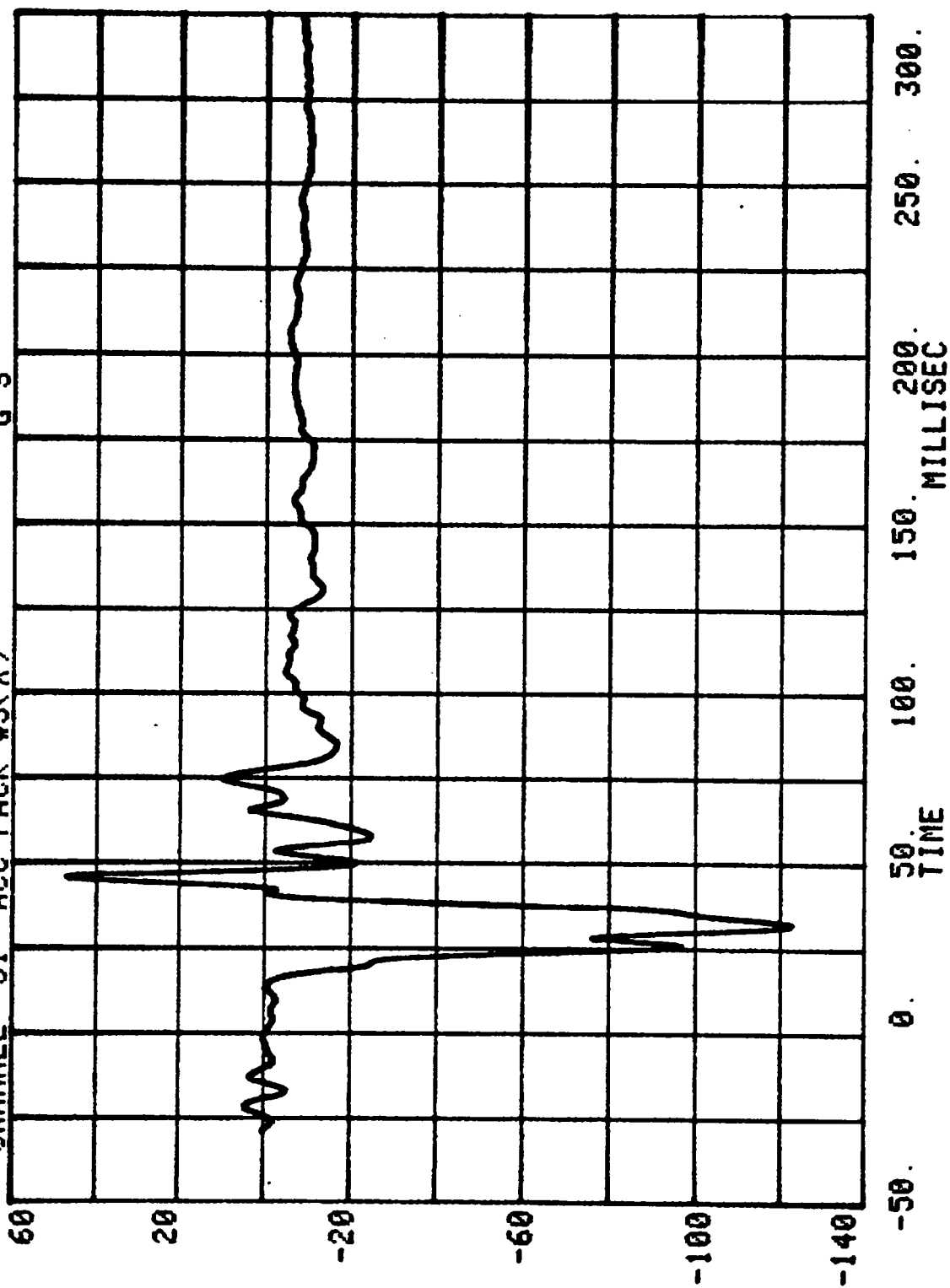
ACC. PACK. #4 (X)

CHANNEL 12 DISPLACEMENT
SERIES= 301 INCHES

RUN= 606

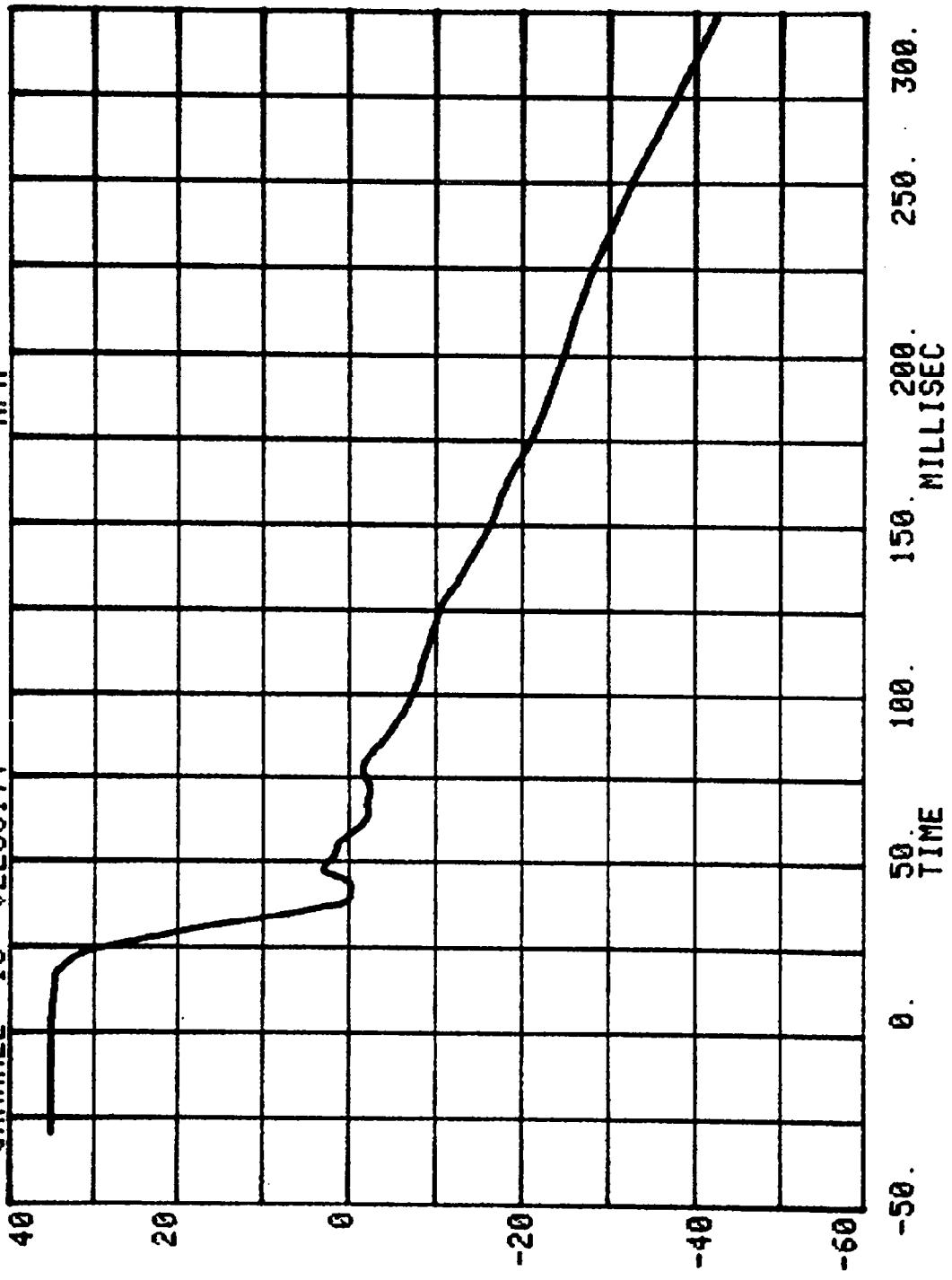


CHANNEL 31 ACC PACK #5(X) RUN= 606 SERIES= 301 G'S



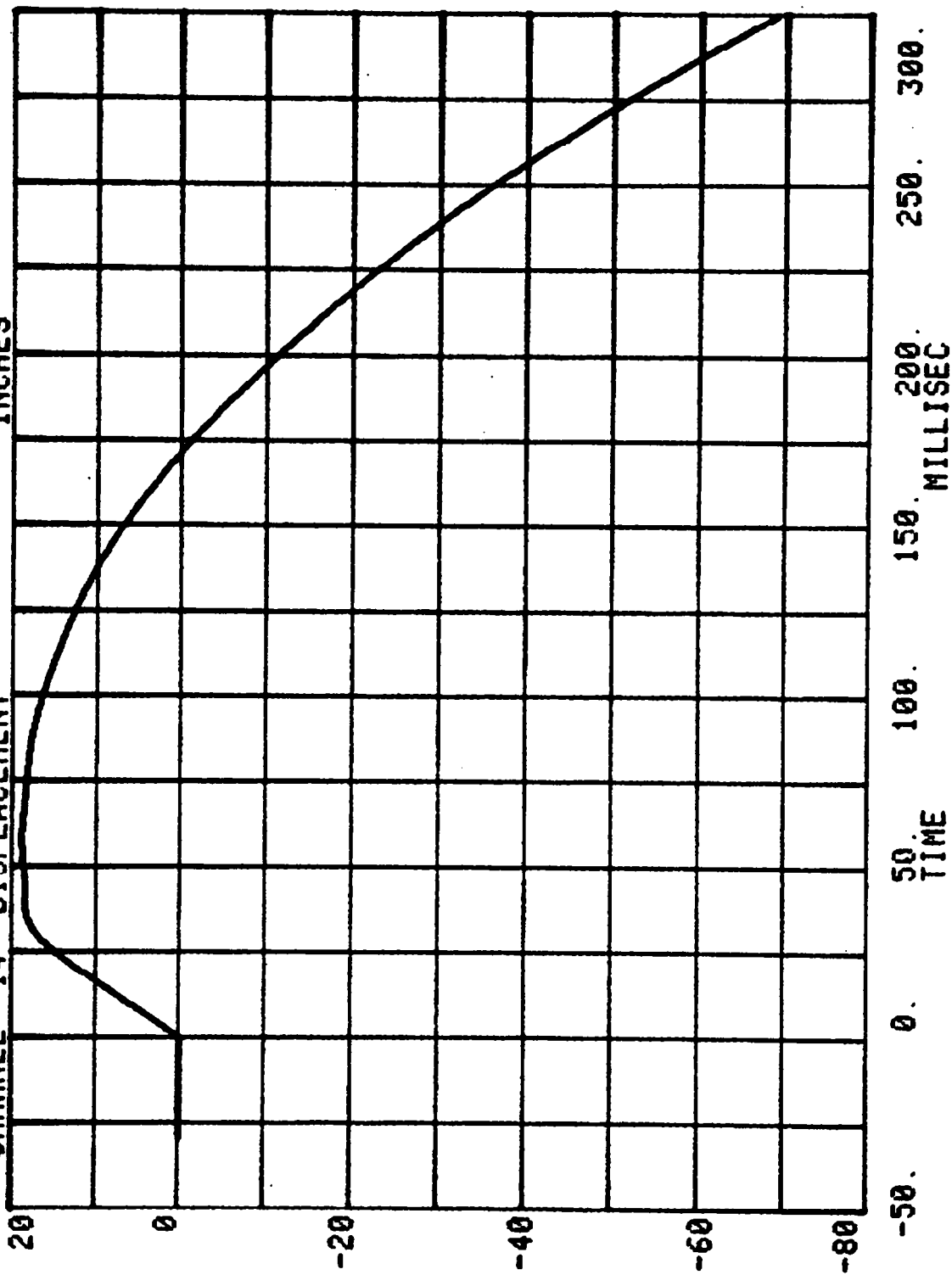
ACC. PACK. #5(X)

CHANNEL 13 VELOCITY
RUN= 606 SERIES= 301 MPH

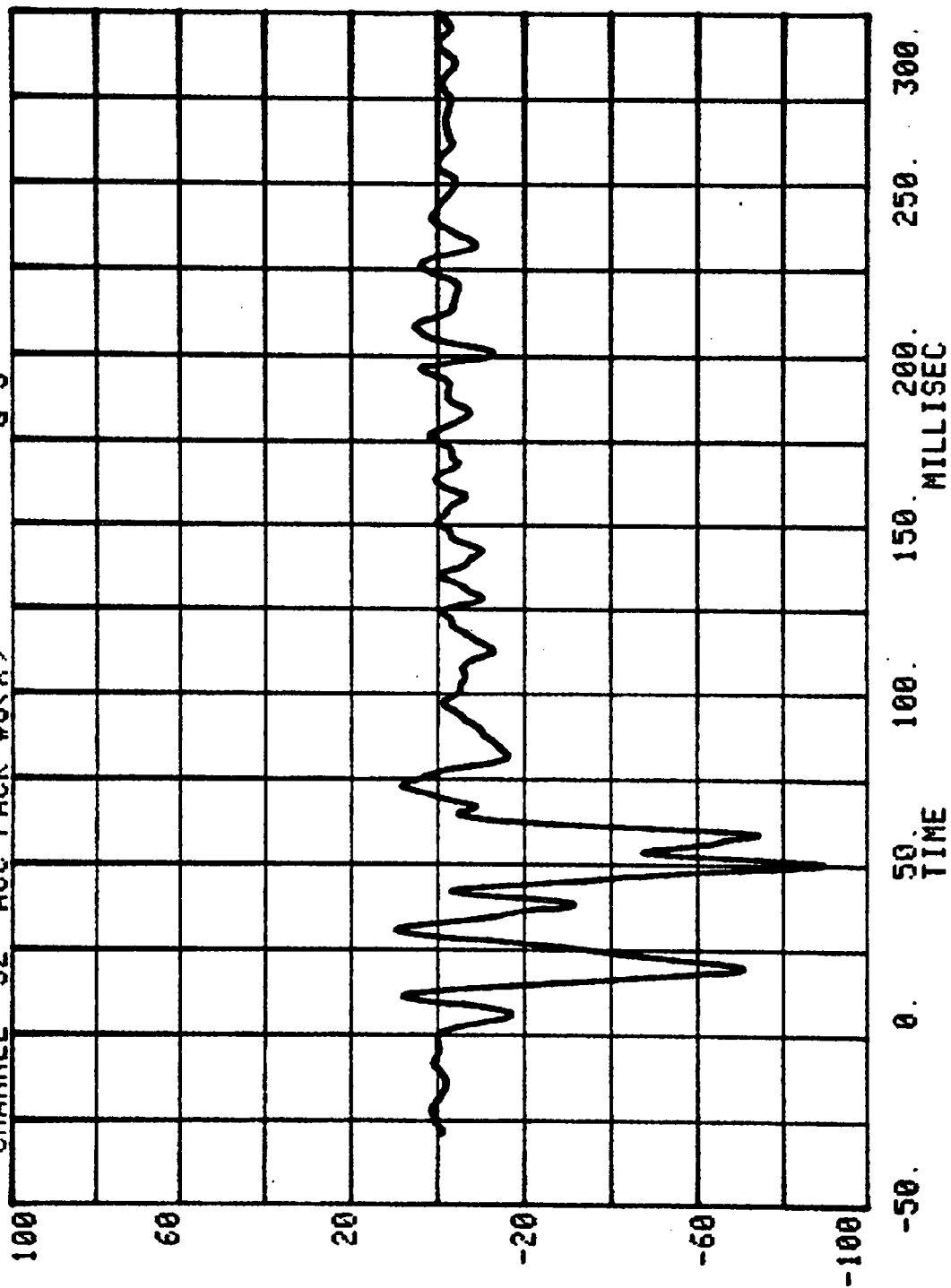


ACC. PACK. #5(X)

CHANNEL 14 DISPLACEMENT
RUN= 606 SERIES= 301 INCHES

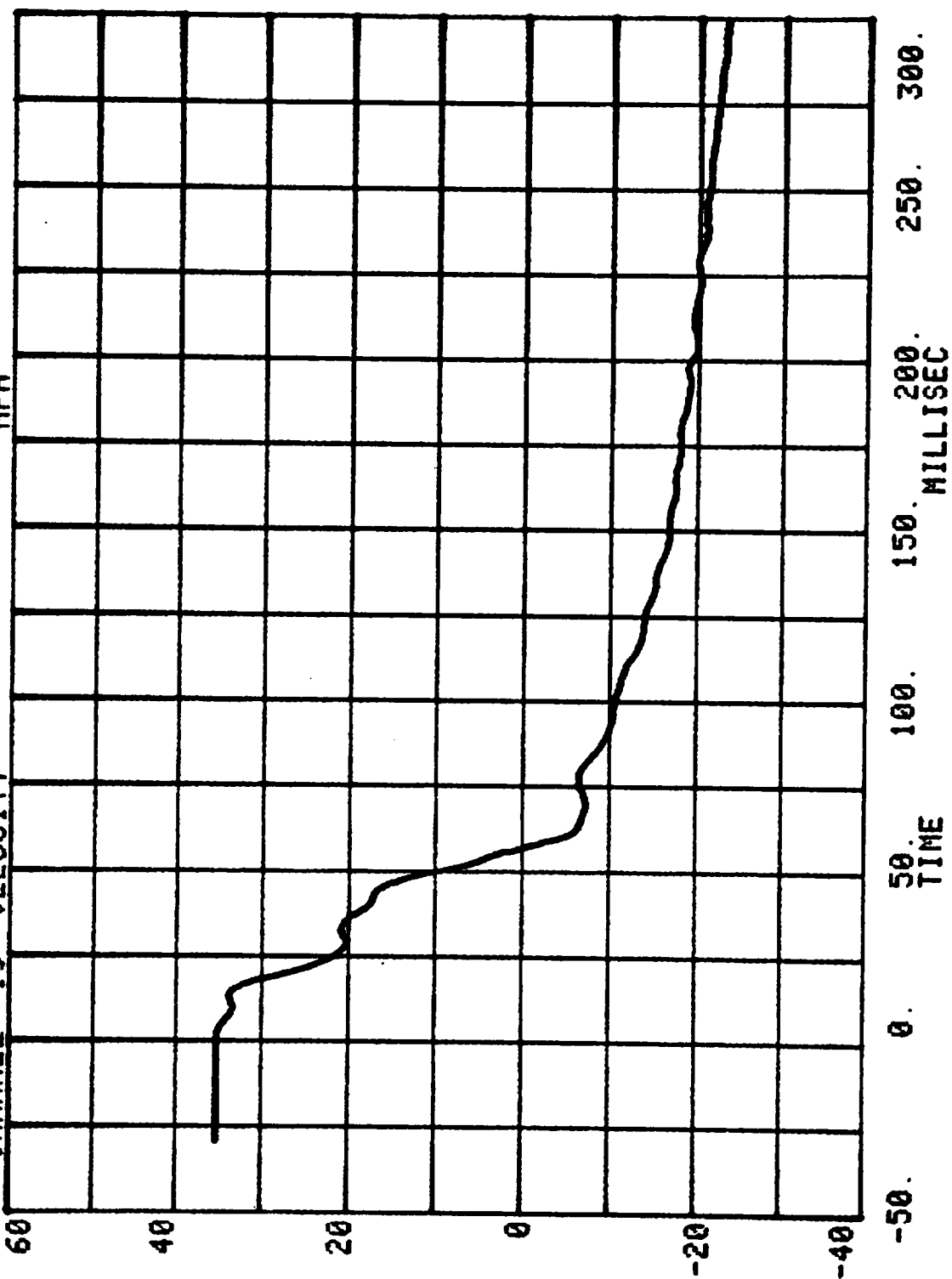


CHANNEL 32 ACC PACK #6(X) RUN= 606 SERIES= 301 G'S



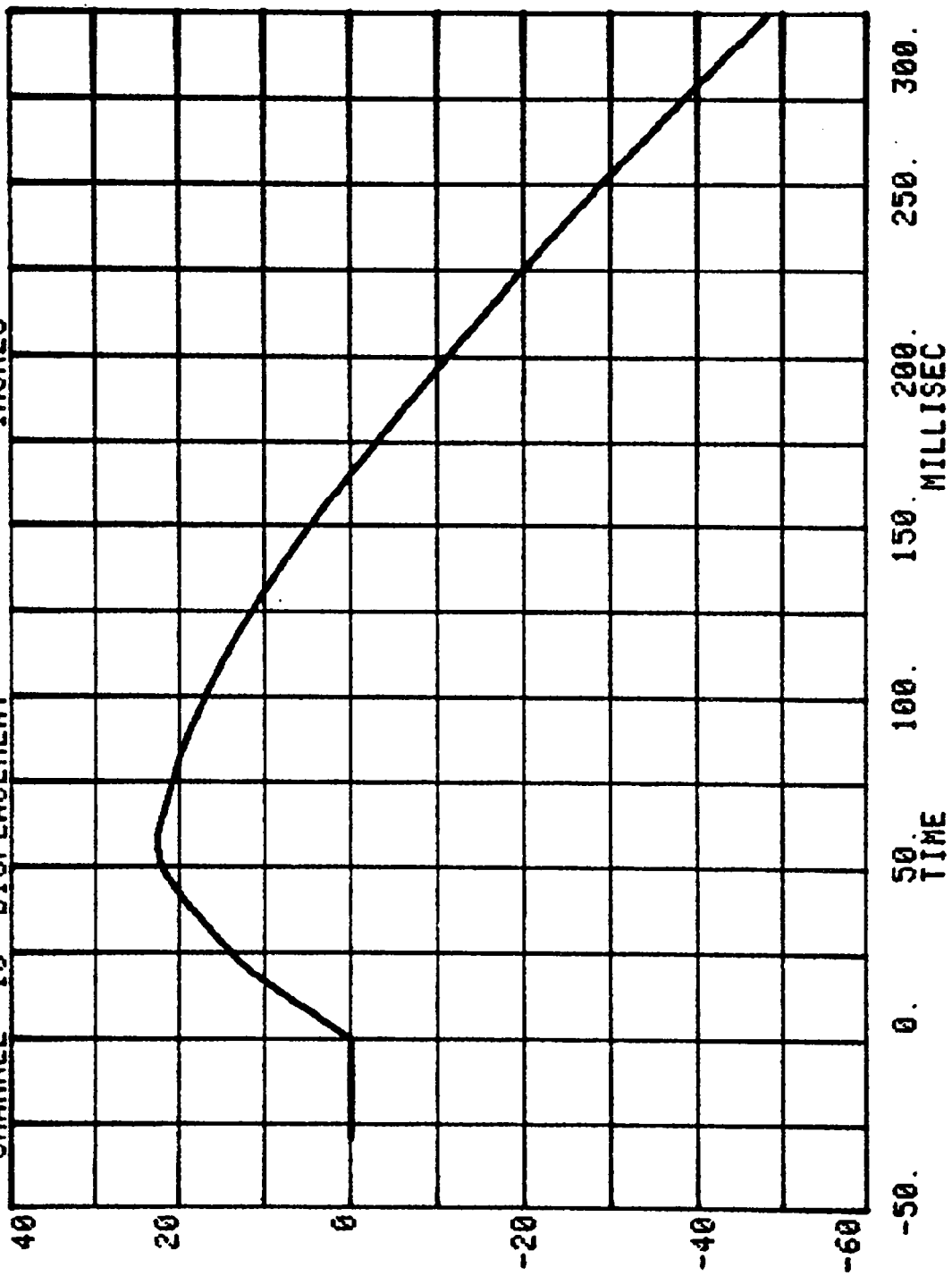
ACC. PACK. #6(X)

CHANNEL 15 VELOCITY
RUN= 606 SERIES= 301 MPH

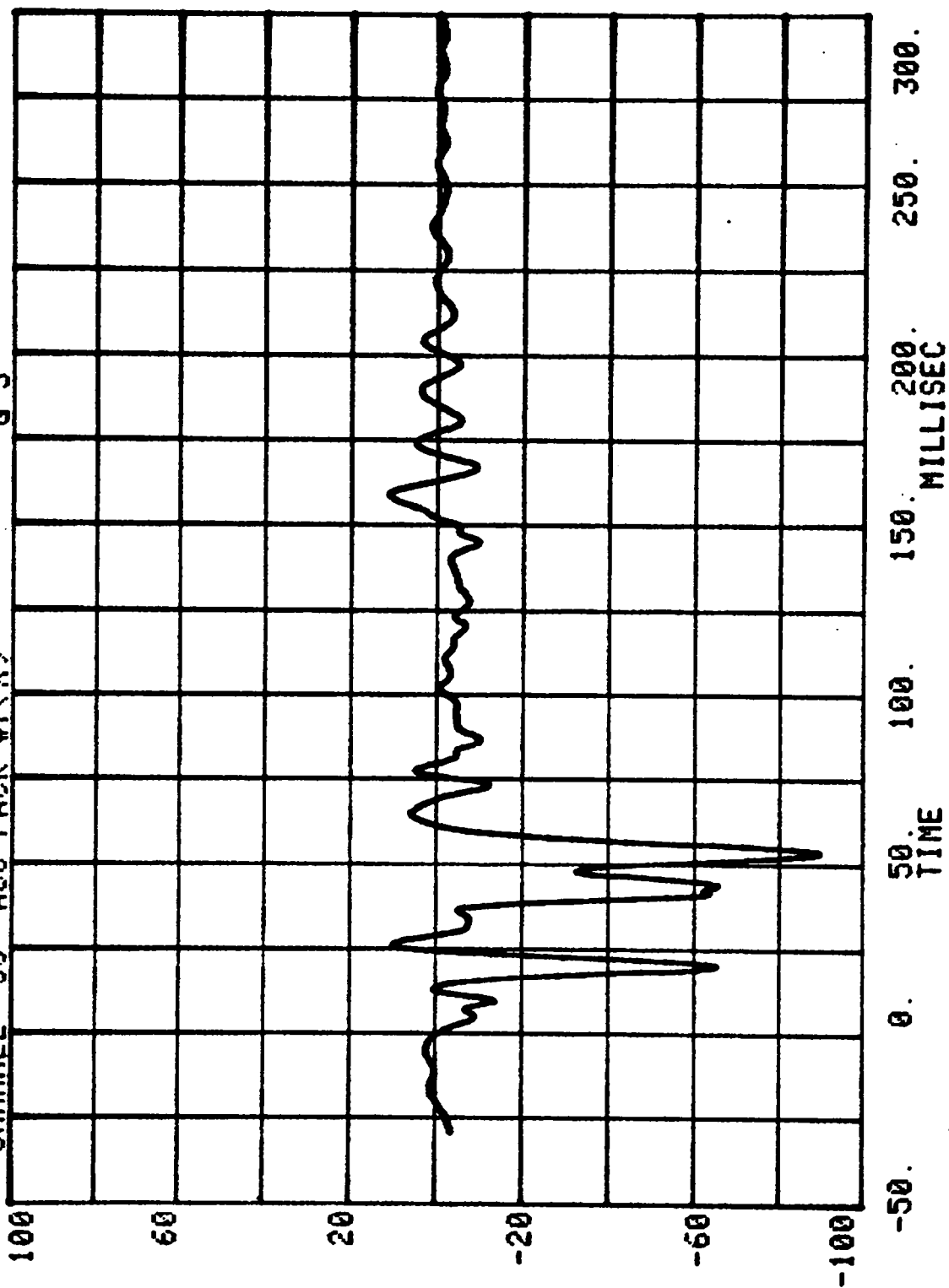


ACC. PACK. #6 (X)

CHANNEL 16 DISPLACEMENT
RUN= 606
SERIES= 301 INCHES

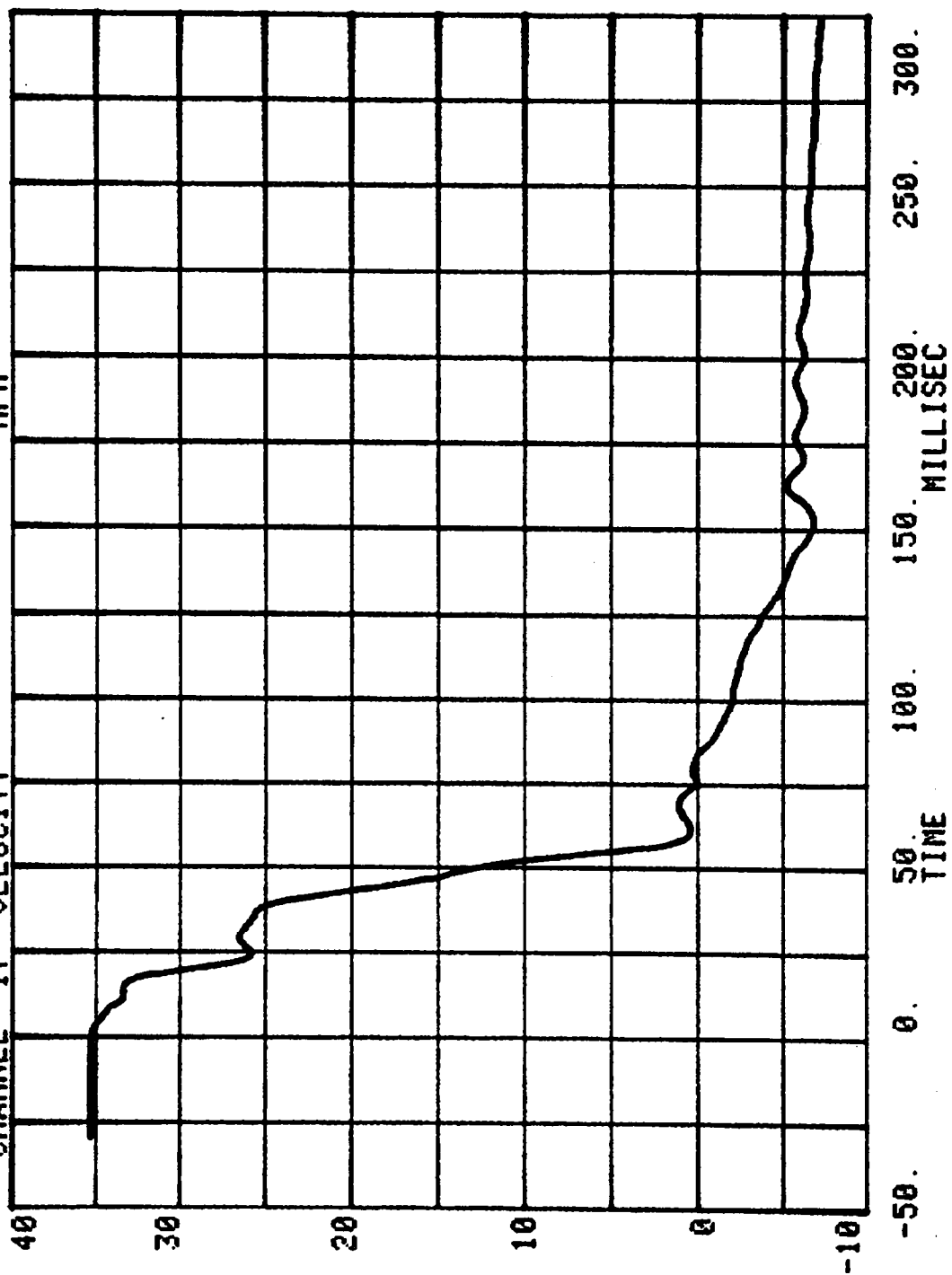


CHANNEL 33 ACC PACK #7(X) RUN= 606 SERIES= 301 G'S



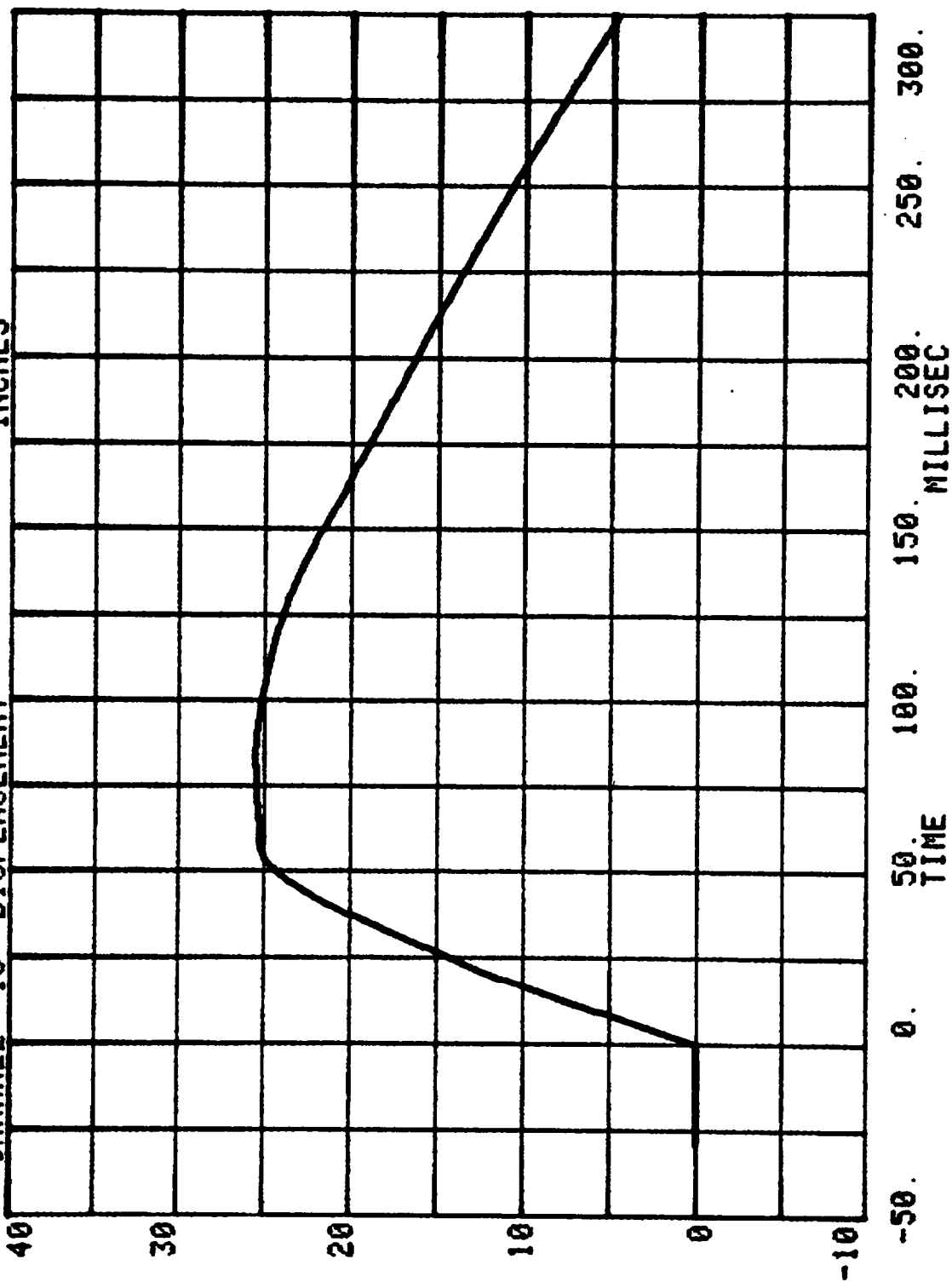
ACC. PACK. #7 (X)

CHANNEL 17 VELOCITY
RUN= 606 SERIES= 301 MPH



ACC. PACK. #7(X)

CHANNEL 18 DISPLACEMENT
RUN= 606 SERIES= 301 INCHES

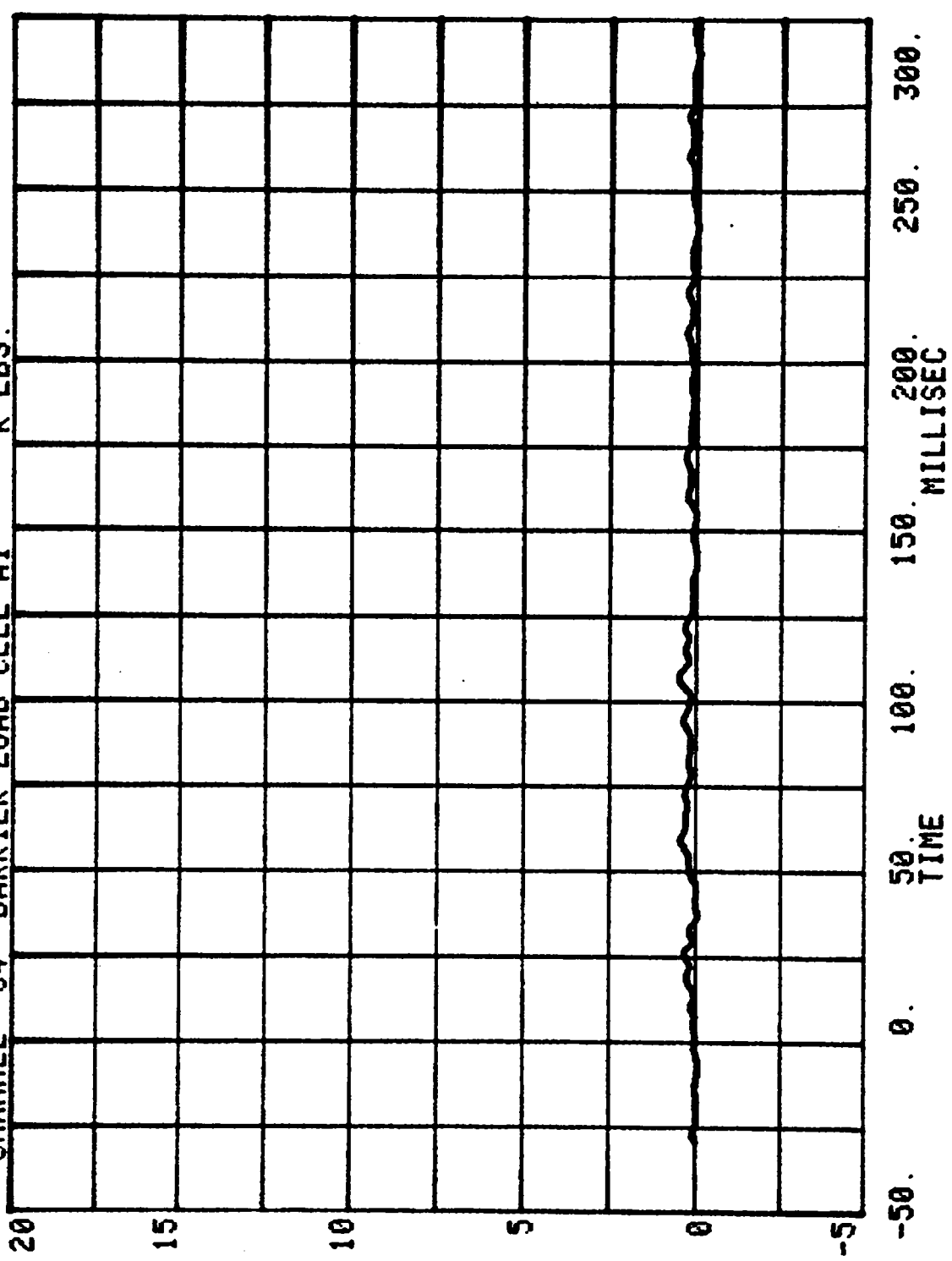


TEST NO. CE0301

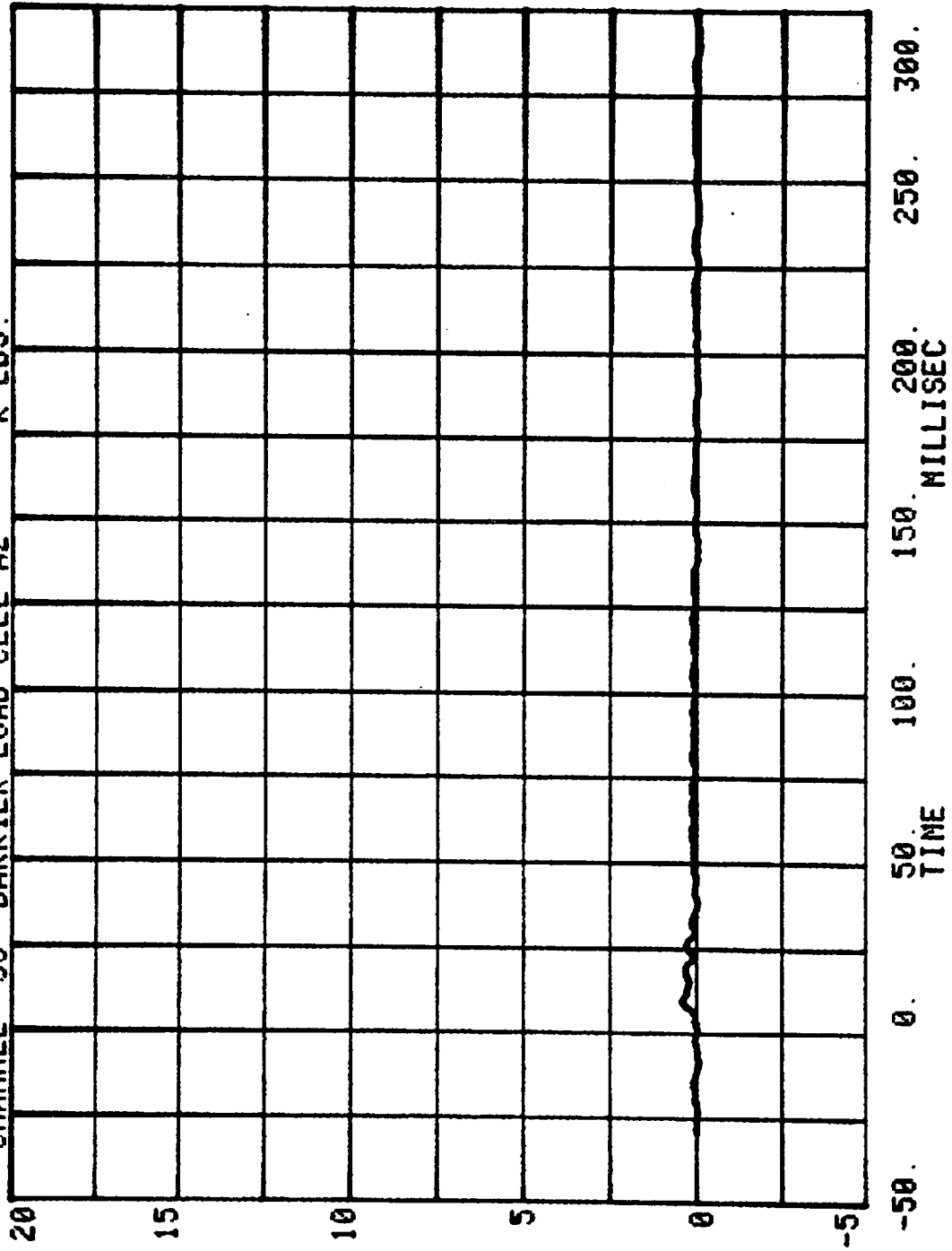
LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

60

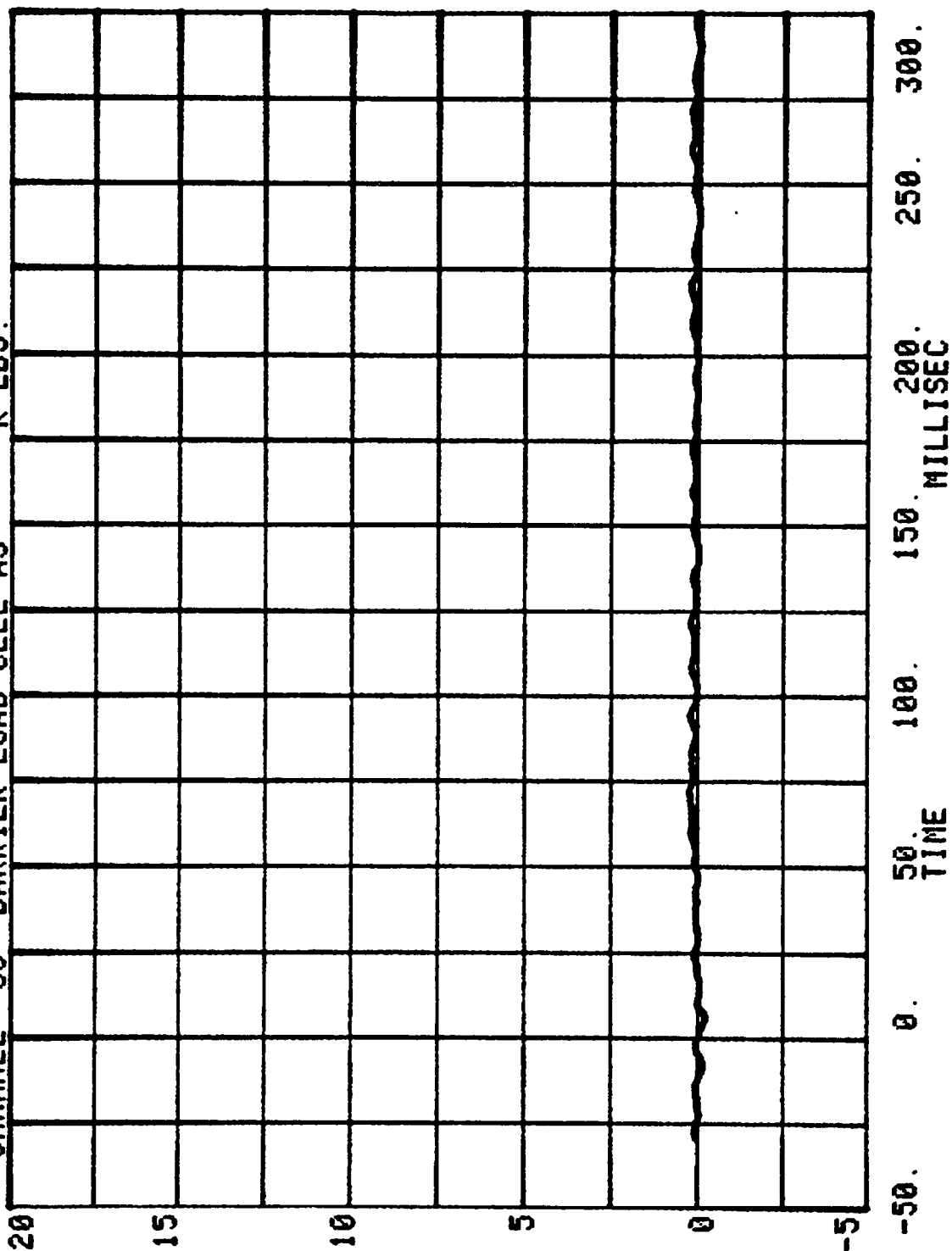
CHANNEL 34 RUN= 606 SERIES= 301 K LBS.
BARRIER LOAD CELL A1



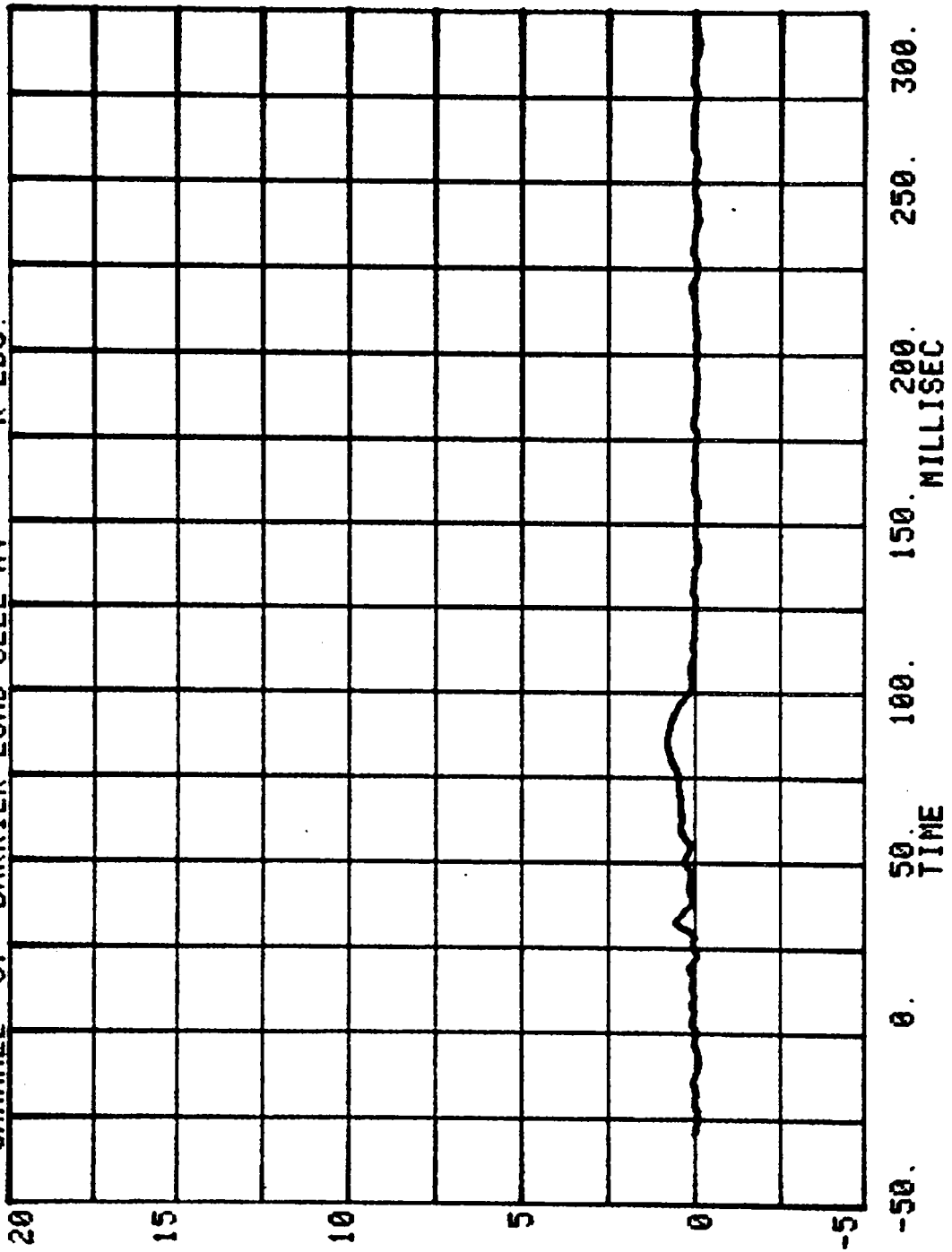
CHANNEL 35 BARRIER LOAD CELL A2 RUN= 606 SERIES= 301 K LBS.



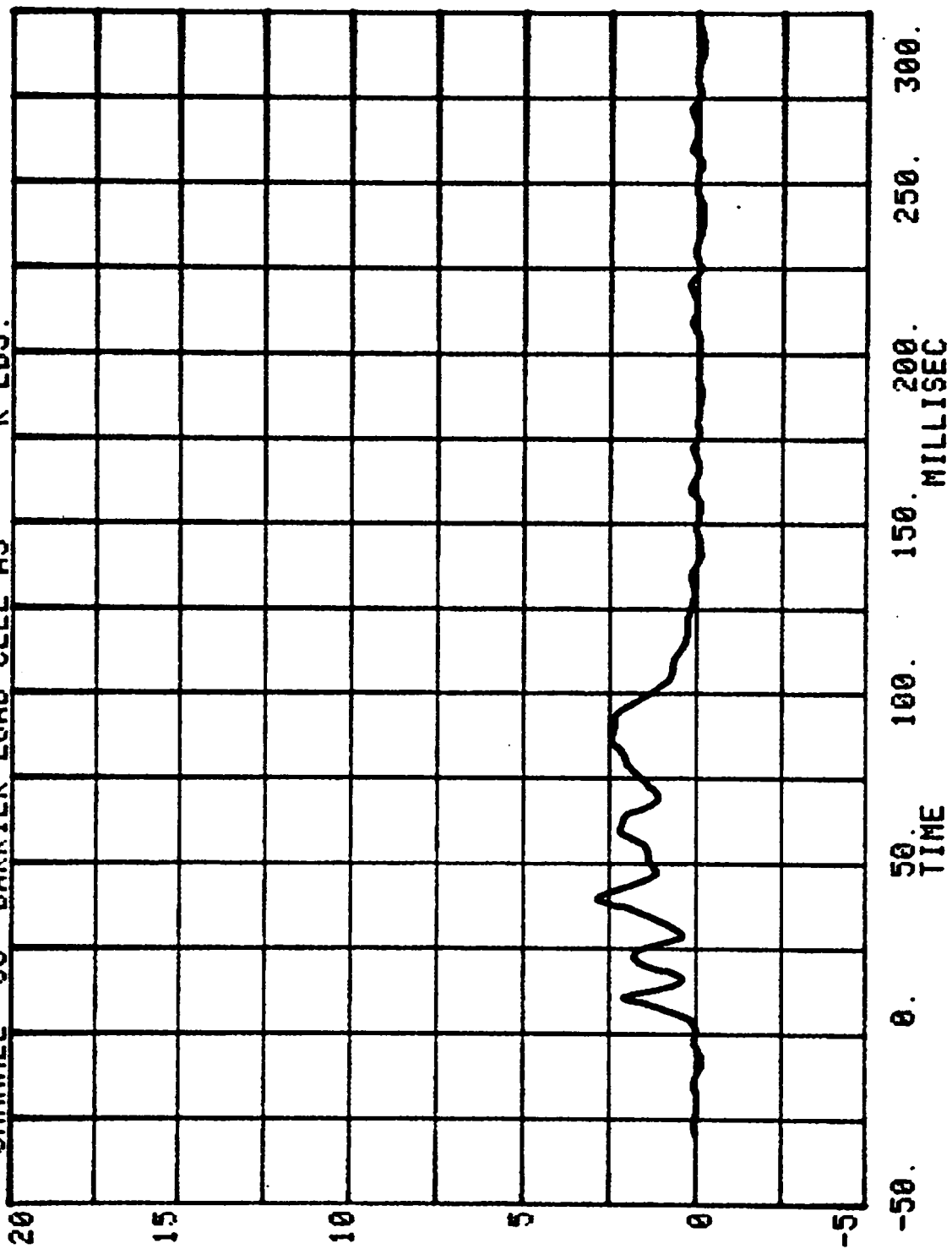
CHANNEL 36 BARRIER LOAD CELL A3 RUN= 606 SERIES= 301 K LBS.



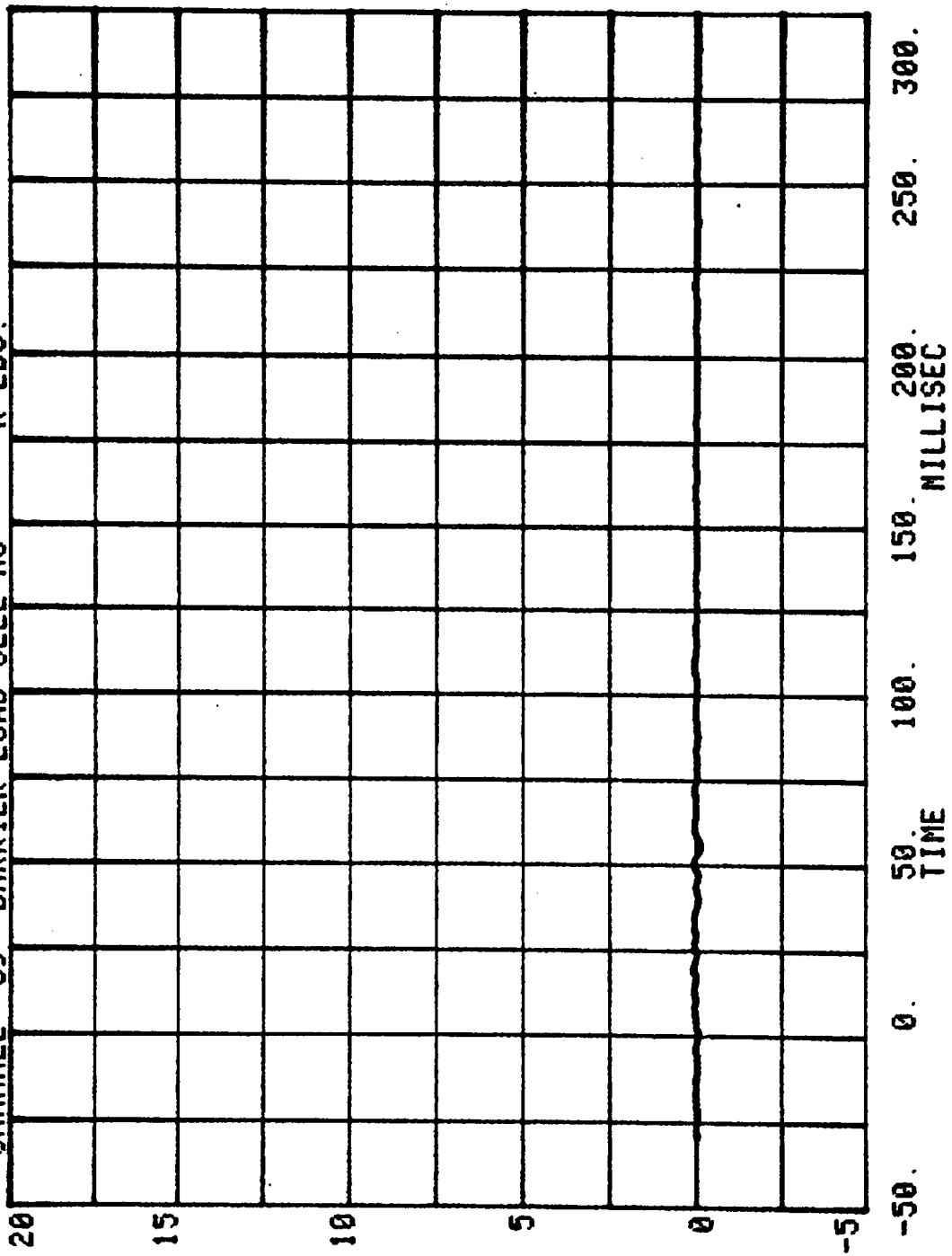
CHANNEL 37 BARRIER LOAD CELL A4 RUN= 606 SERIES= 301 K LBS.



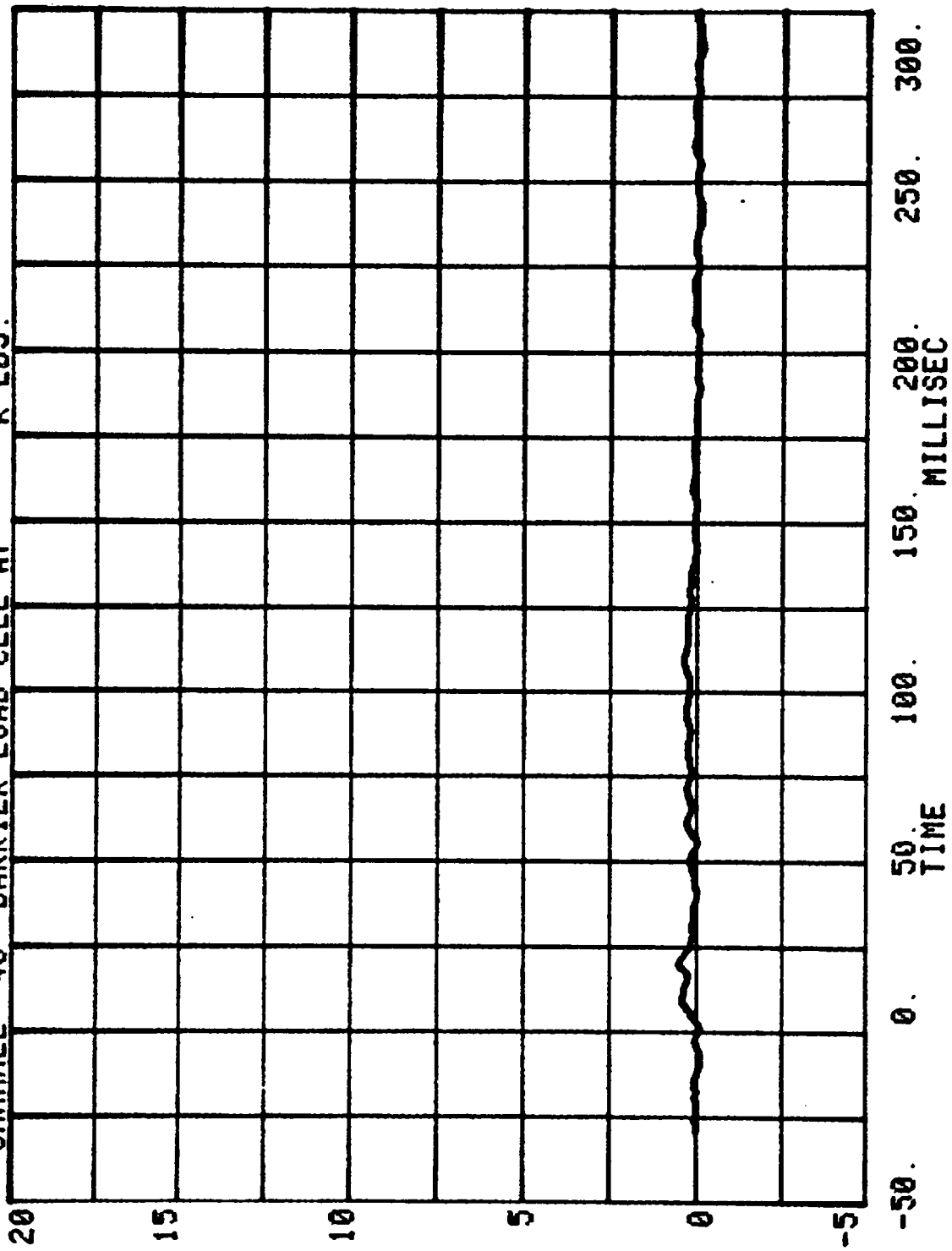
CHANNEL 38 BARRIER LOAD CELL A5
RUN= 606 SERIES= 301
K LBS.



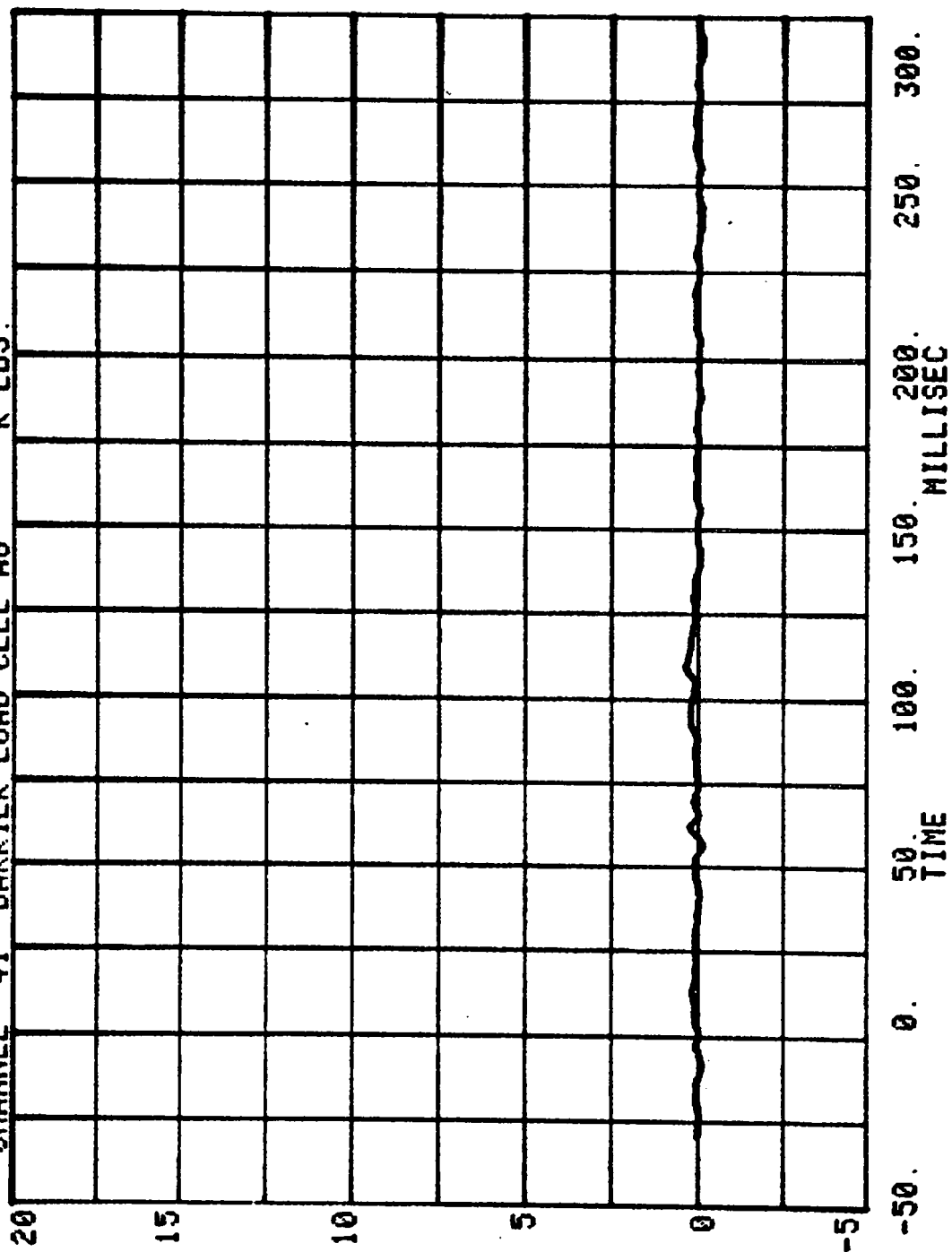
CHANNEL 39 RUN= 606 SERIES= 301 K LBS.
BARRIER LOAD CELL A6



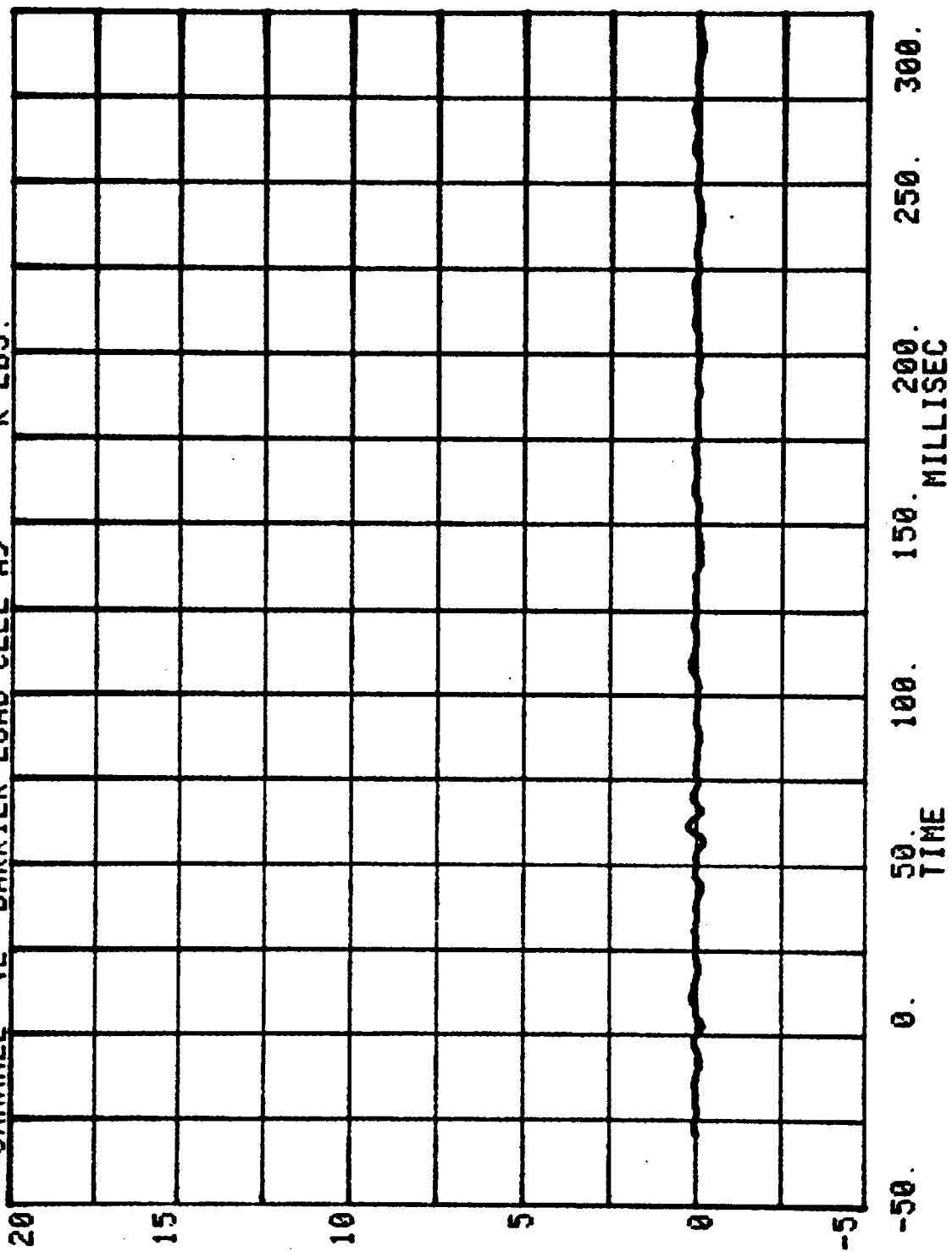
RUN= 606 SERIES= 301
CHANNEL 40 BARRIER LOAD CELL A7 K LBS.



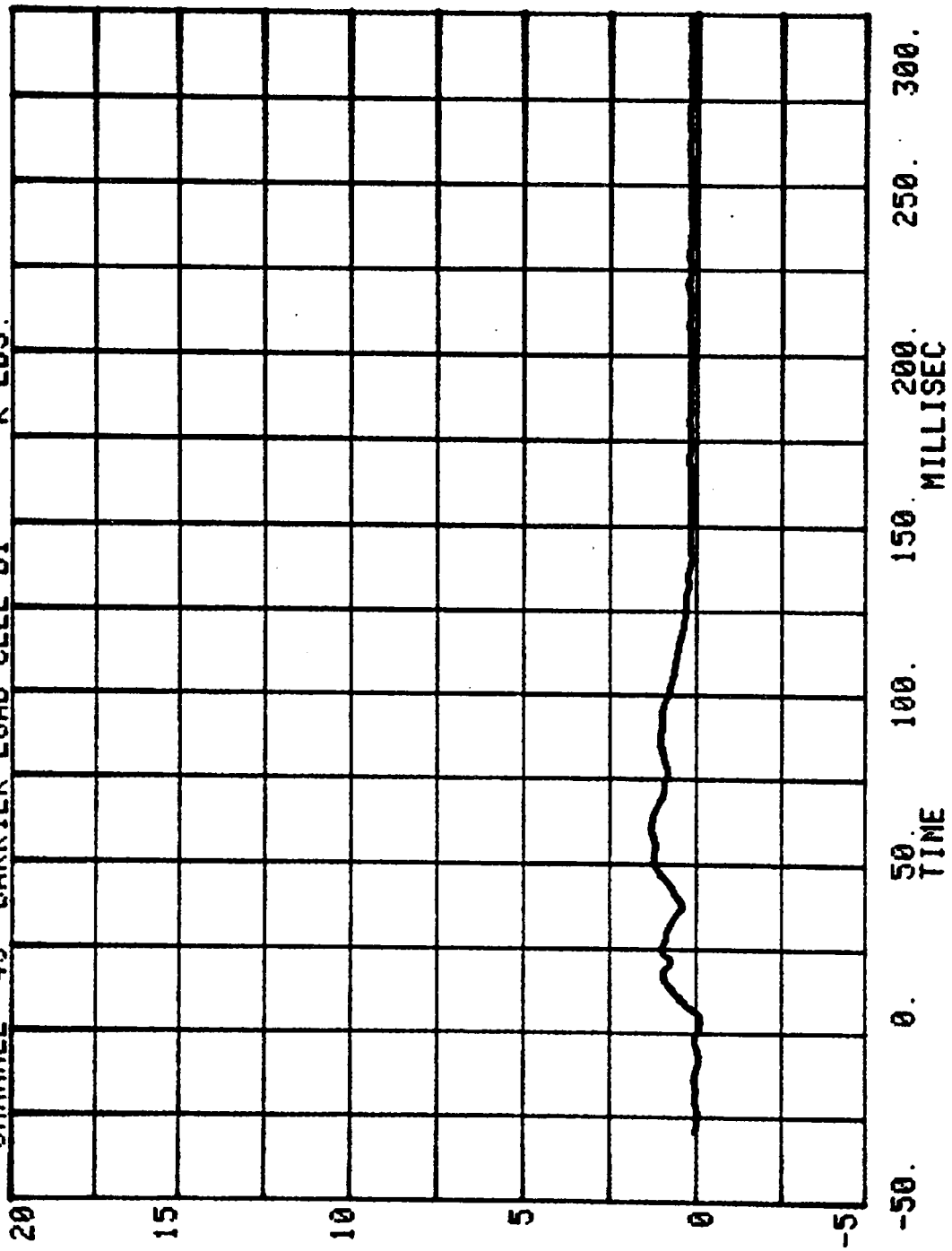
CHANNEL 41 BARRIER LOAD CELL A8 RUN= 606 SERIES= 301 K LBS.



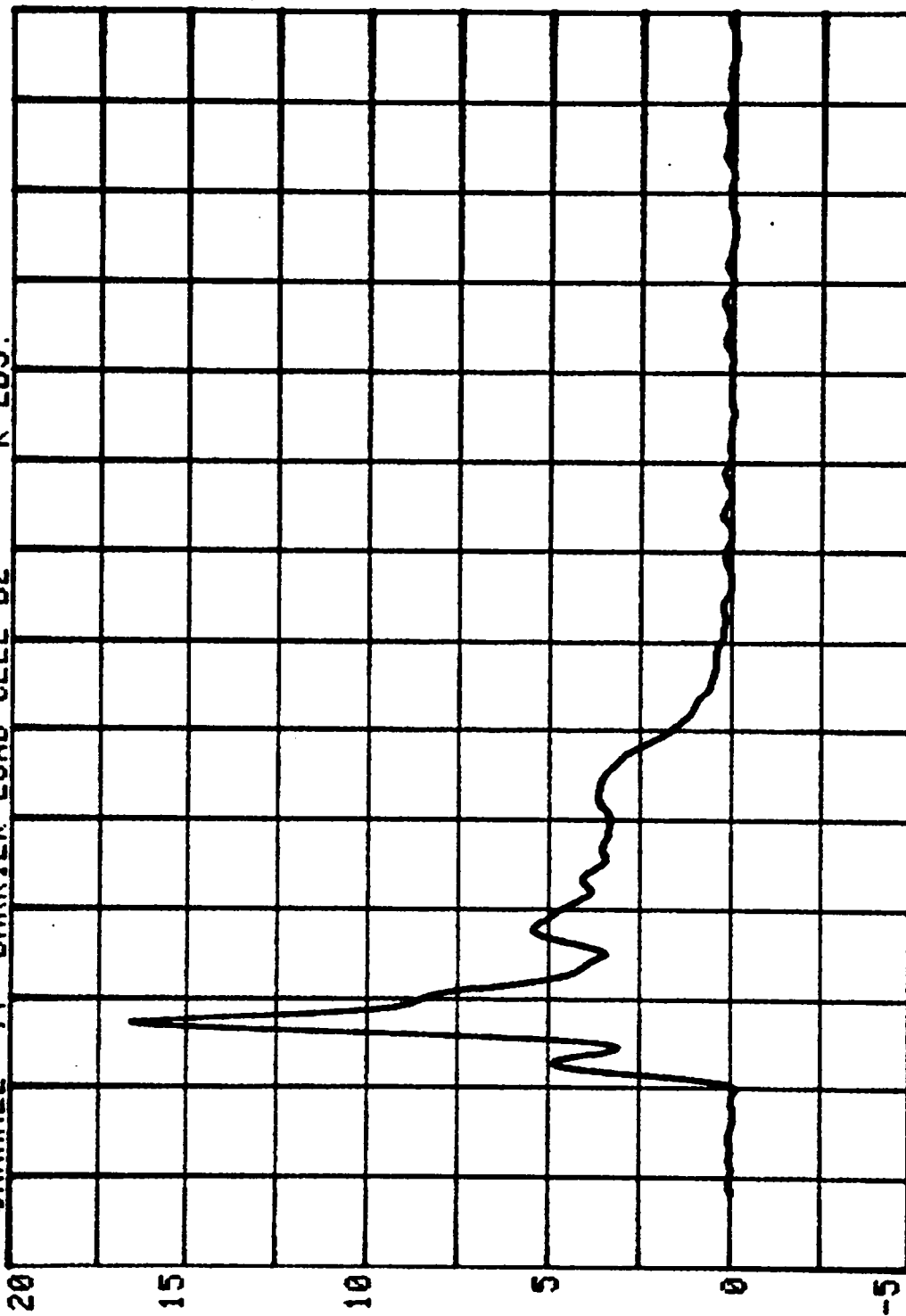
CHANNEL 42 RUN= 606 SERIES= 301
BARRIER LOAD CELL A9 K LBS.



CHANNEL 43 BARRIER LOAD CELL B1
RUN= 606 SERIES= 301 K LBS.

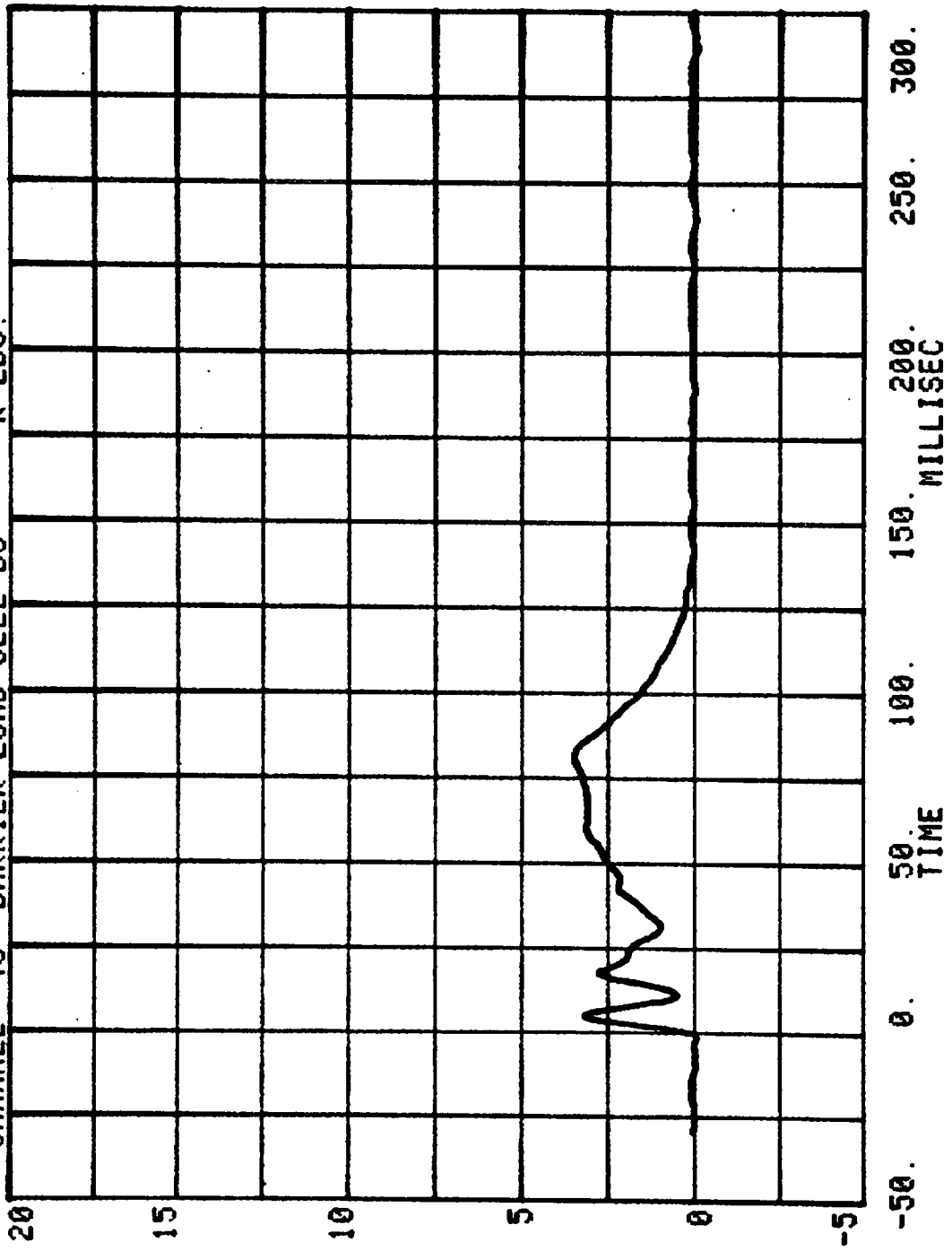


CHANNEL 44 BARRIER LOAD CELL B2
RUN= 606 SERIES= 301
K LBS.

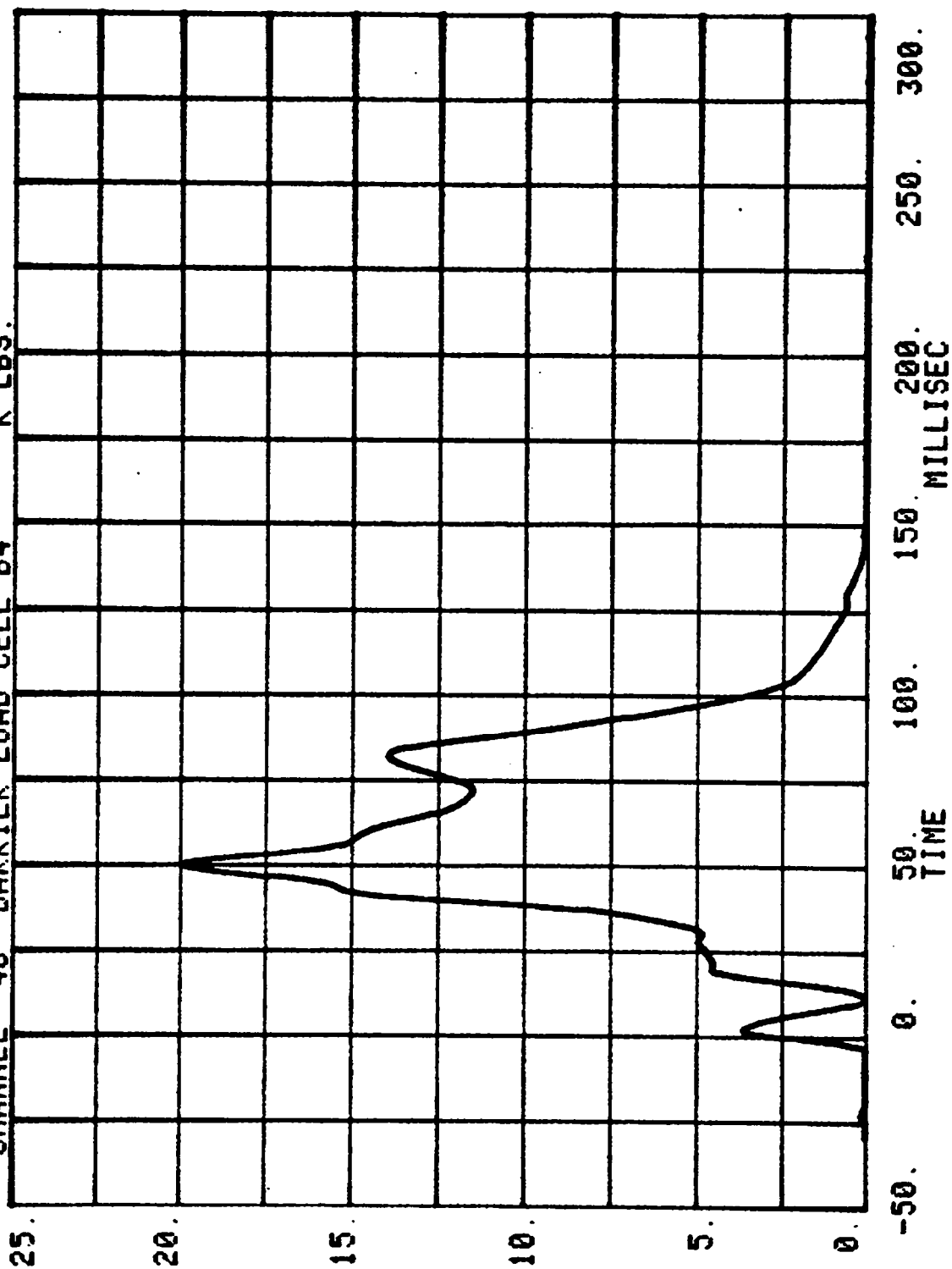


-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

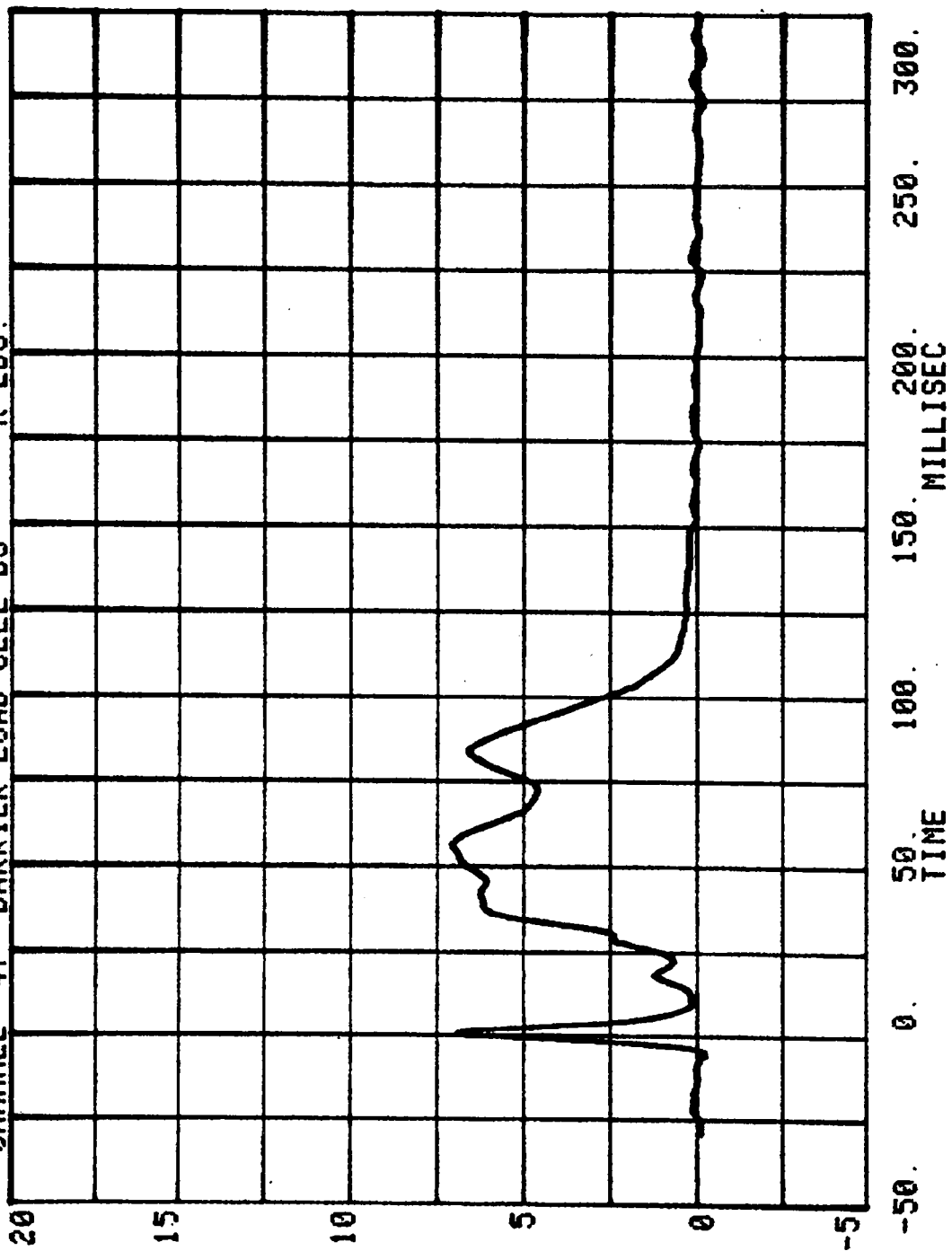
RUN= 606 SERIES= 301
CHANNEL 45 BARRIER LOAD CELL B3 K LBS.



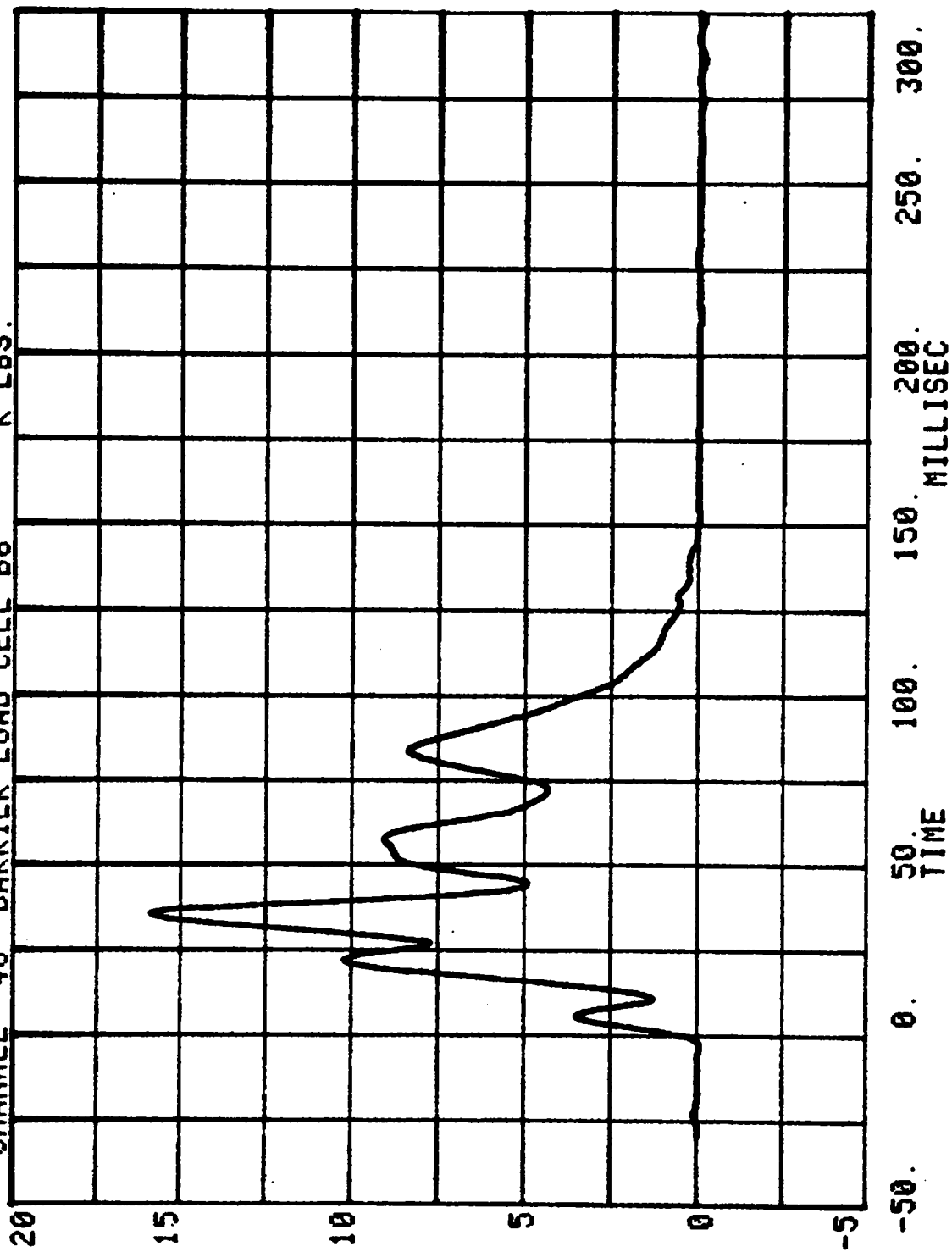
CHANNEL 46 BARRIER LOAD CELL B4
RUN= 606 SERIES= 301
K LBS.



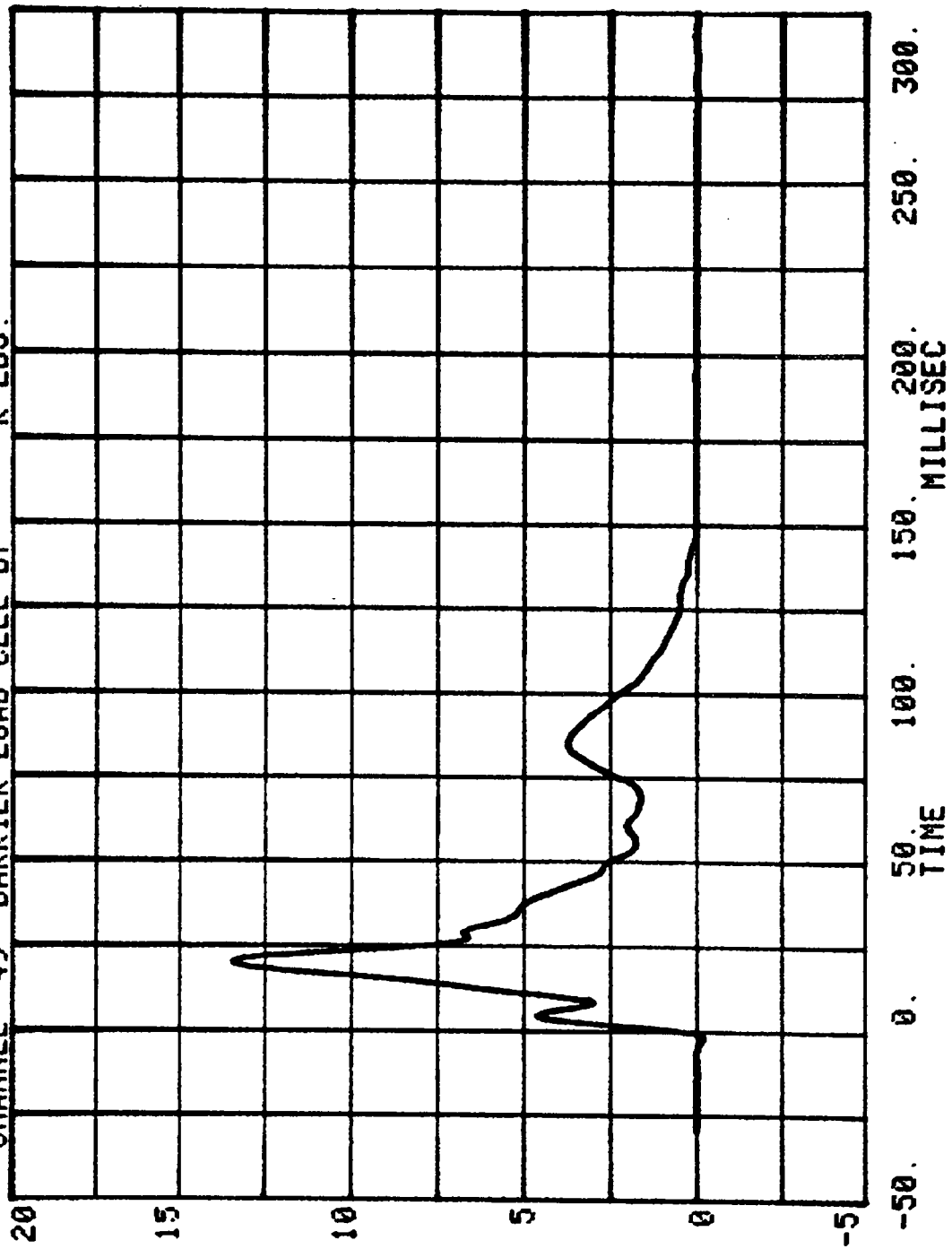
CHANNEL 47 BARRIER LOAD CELL B5
RUN= 606 SERIES= 301 K LBS.



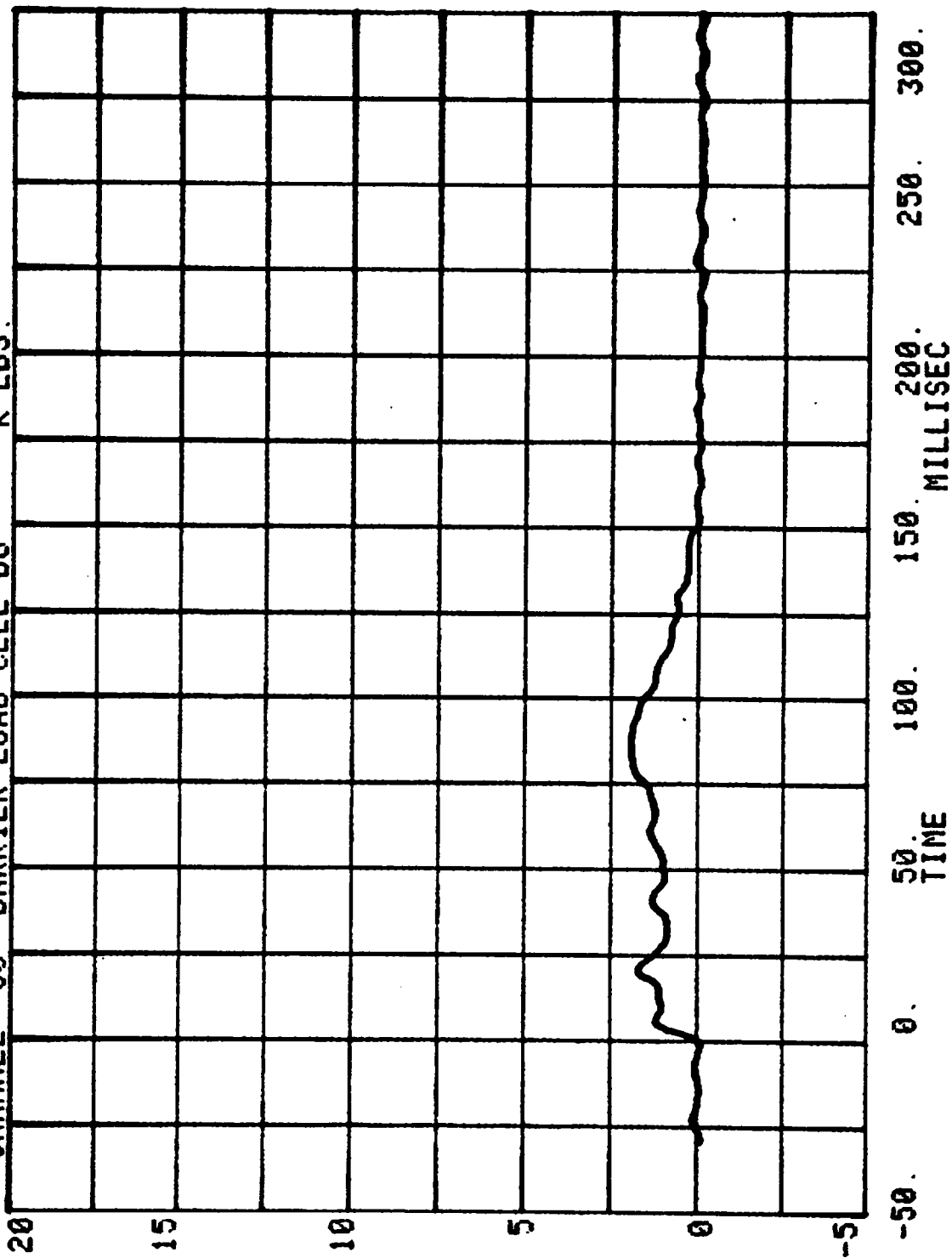
CHANNEL 48 BARRIER LOAD CELL B6 RUN= 606 SERIES= 301 K LBS.



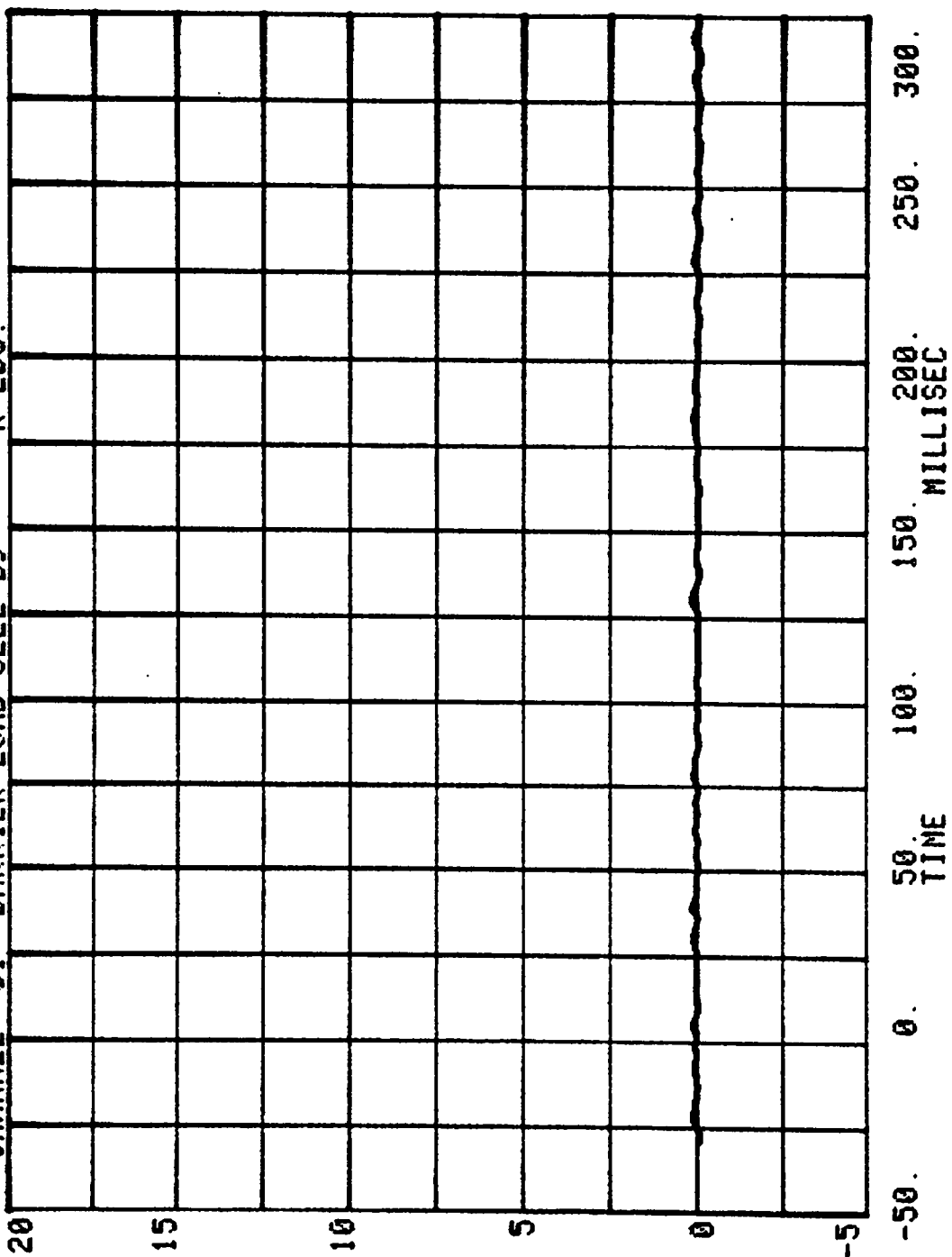
CHANNEL 49 BARRIER LOAD CELL B7
RUN= 606 SERIES= 301 K LBS.



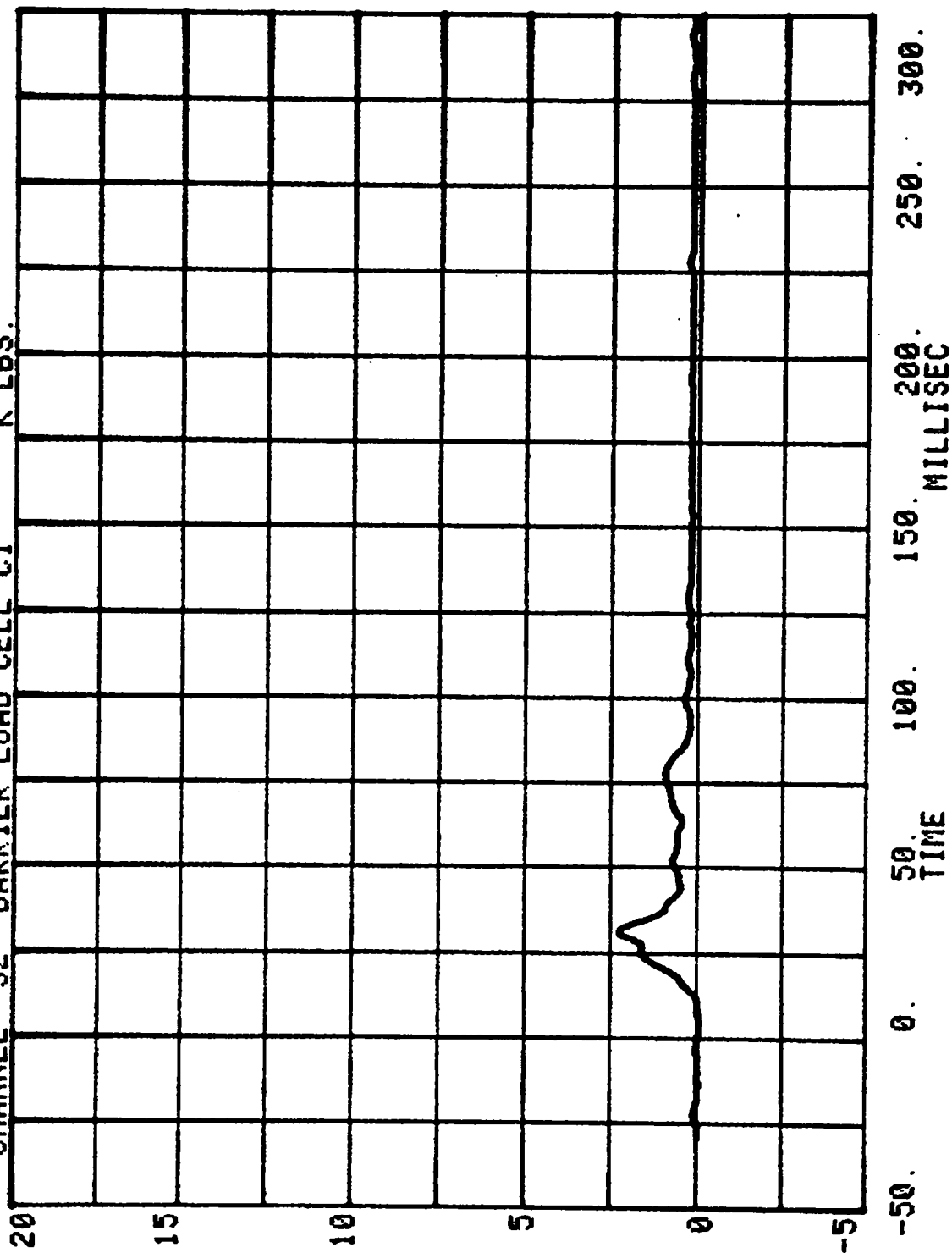
RUN= 606 SERIES= 301
CHANNEL 50 BARRIER LOAD CELL B8 K LBS.



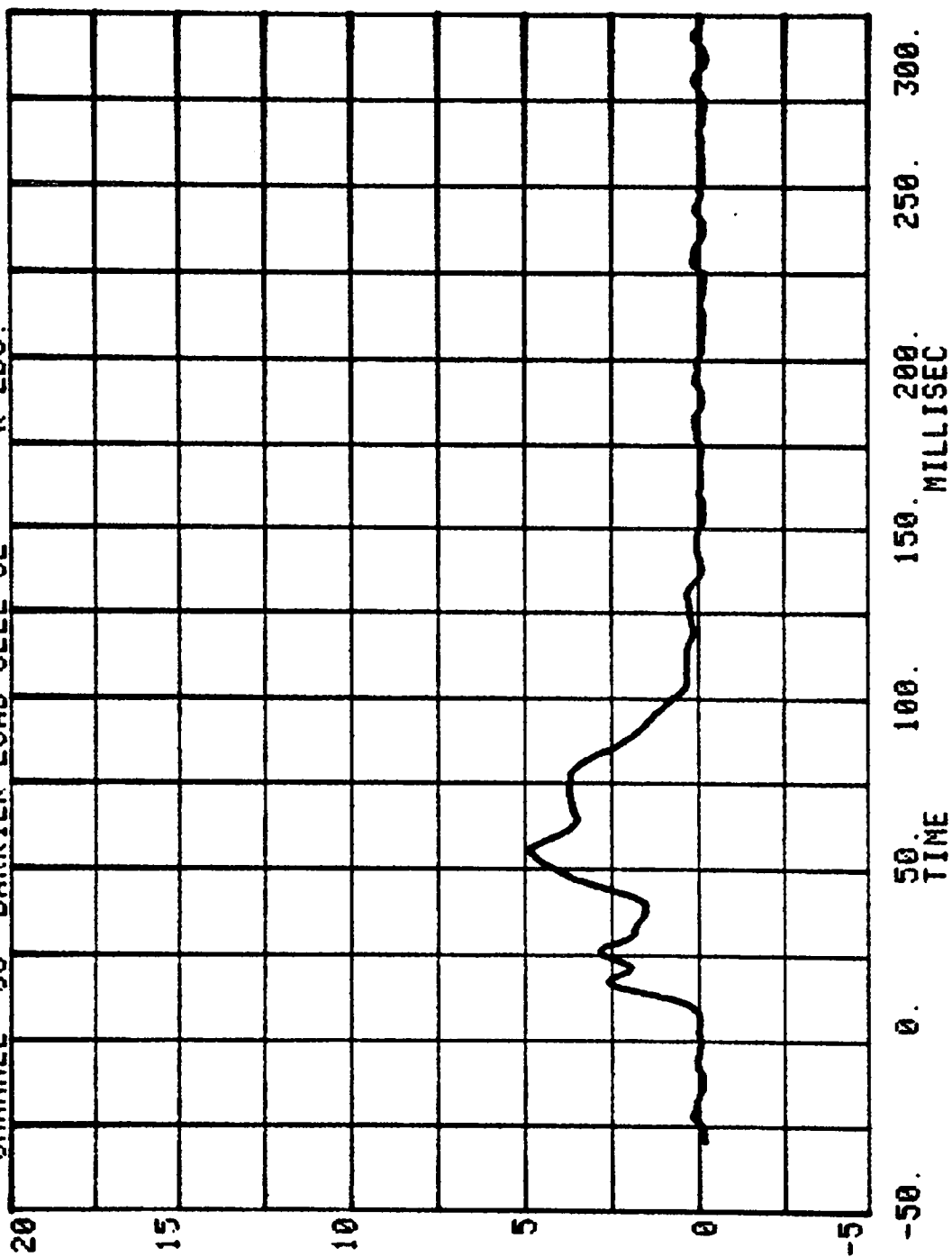
CHANNEL 51 RUN= 606 SERIES= 301
BARRIER LOAD CELL B9 K LBS.



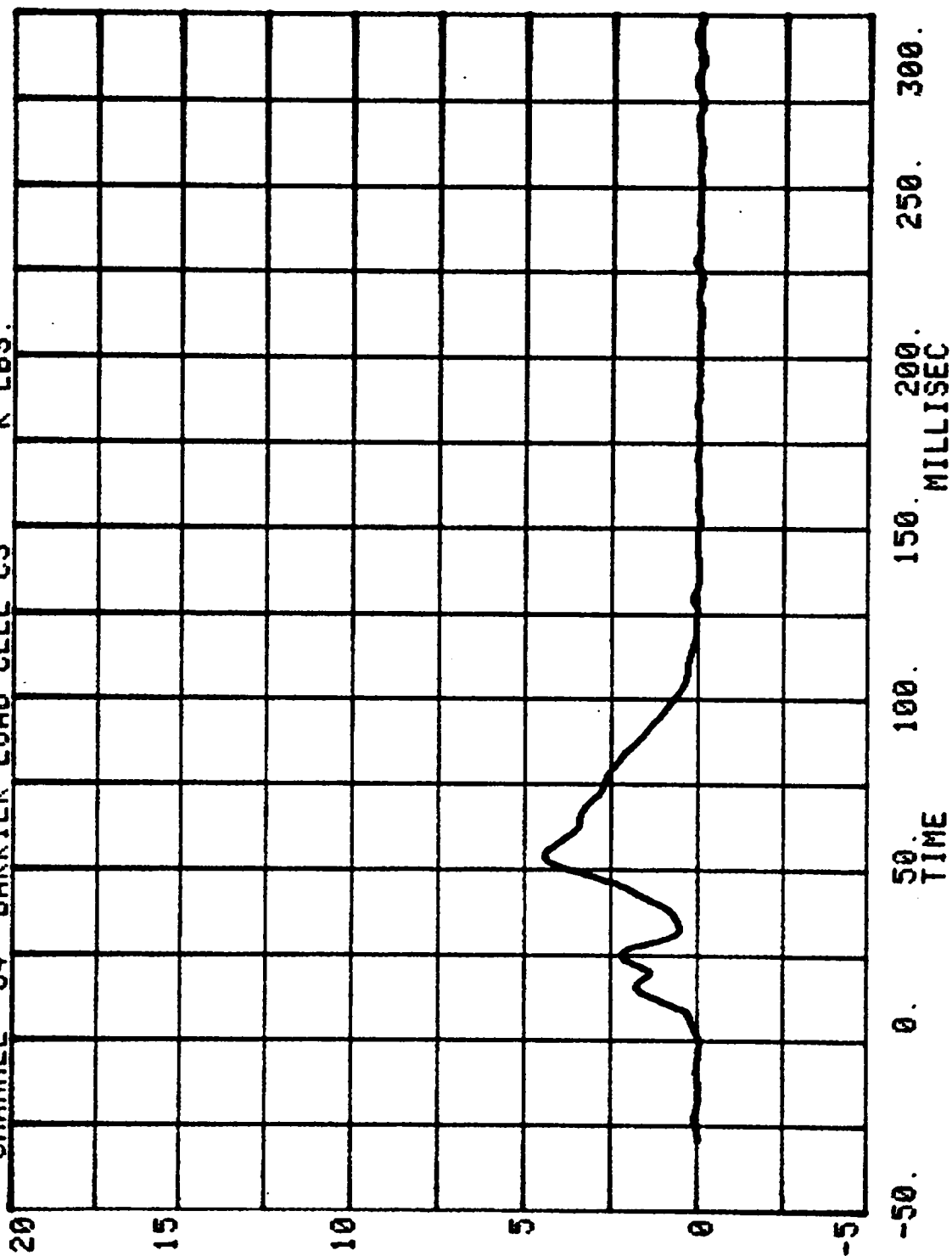
CHANNEL 52 RUN= 606 SERIES= 301 K LBS.



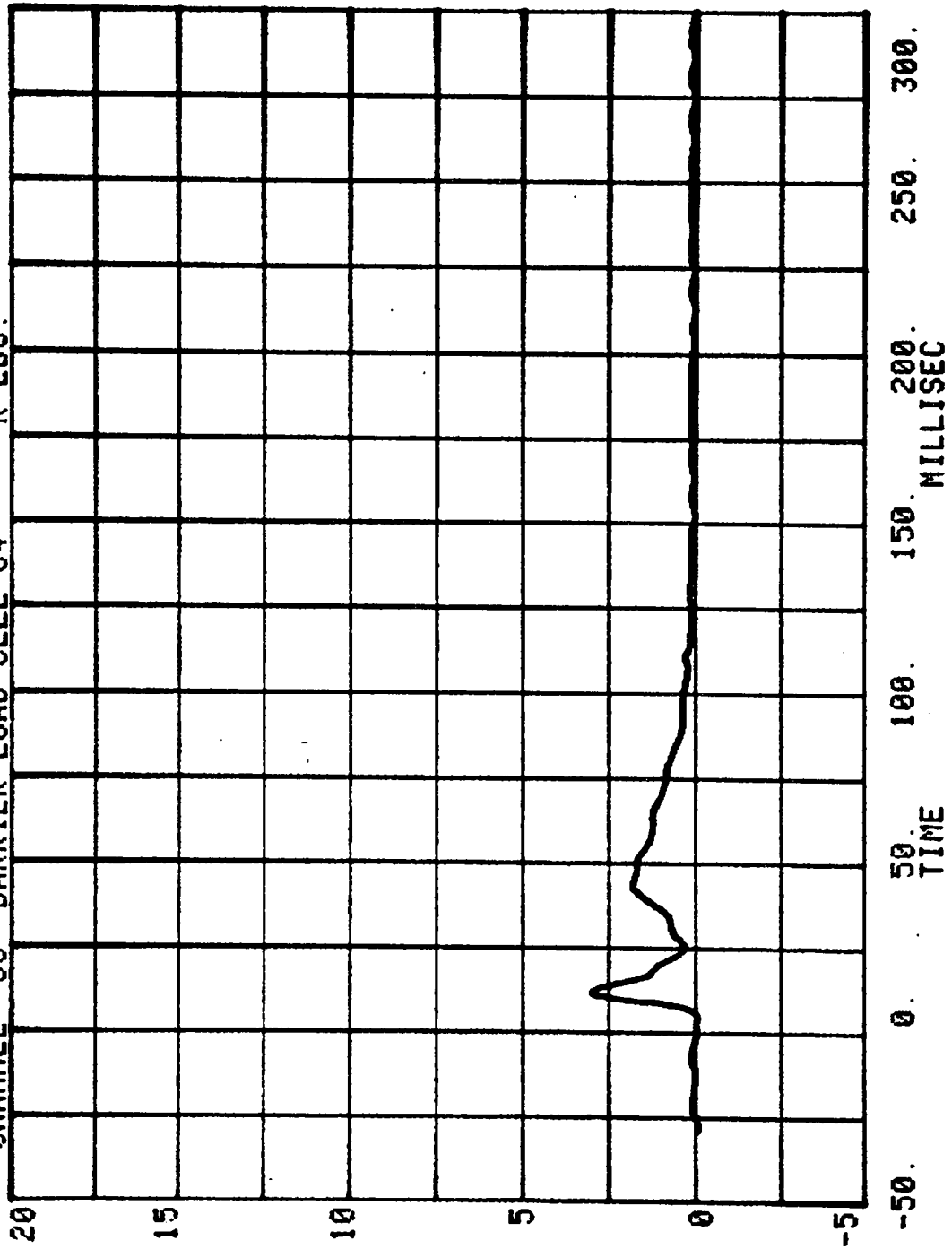
CHANNEL 53 BARRIER LOAD CELL C2 RUN= 606 SERIES= 301 K LBS.



CHANNEL 54 BARRIER LOAD CELL C3 RUN= 606 SERIES= 301 K LBS.



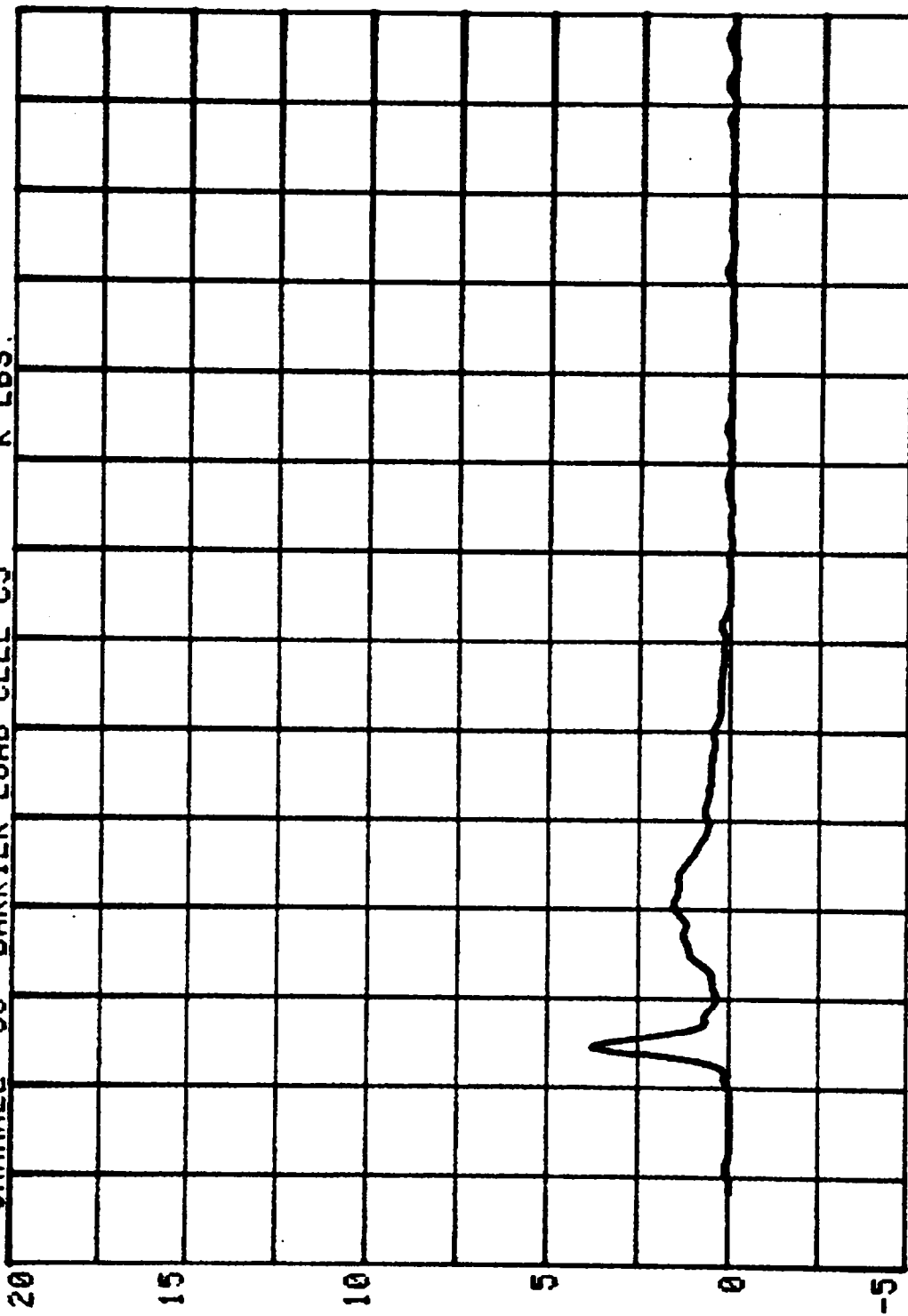
CHANNEL 55 BARRIER LOAD CELL C4 RUN= 606 SERIES= 301 K LBS.



CHANNEL 56 BARRIER LOAD CELL C5

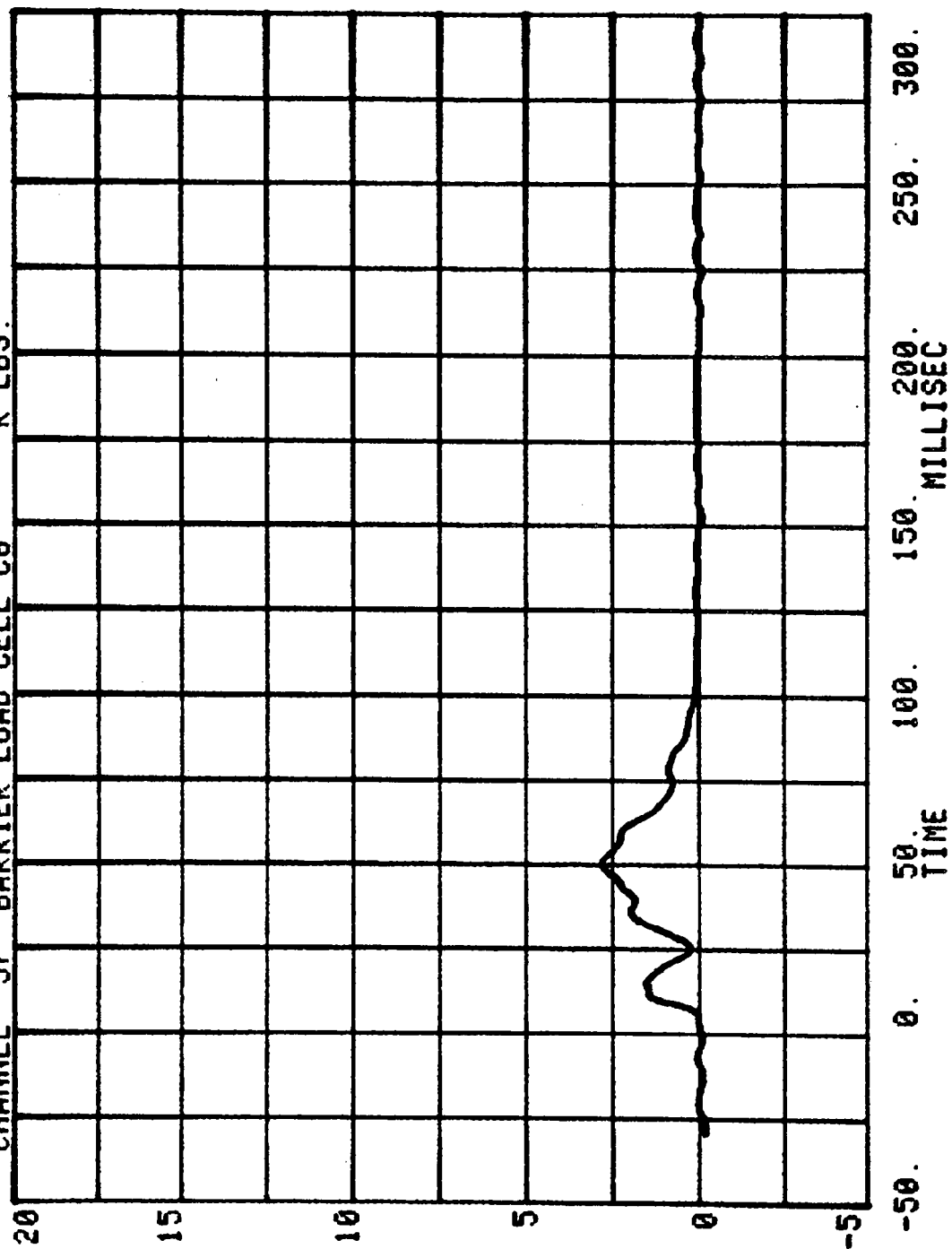
RUN= 606 SERIES= 301

K LBS.

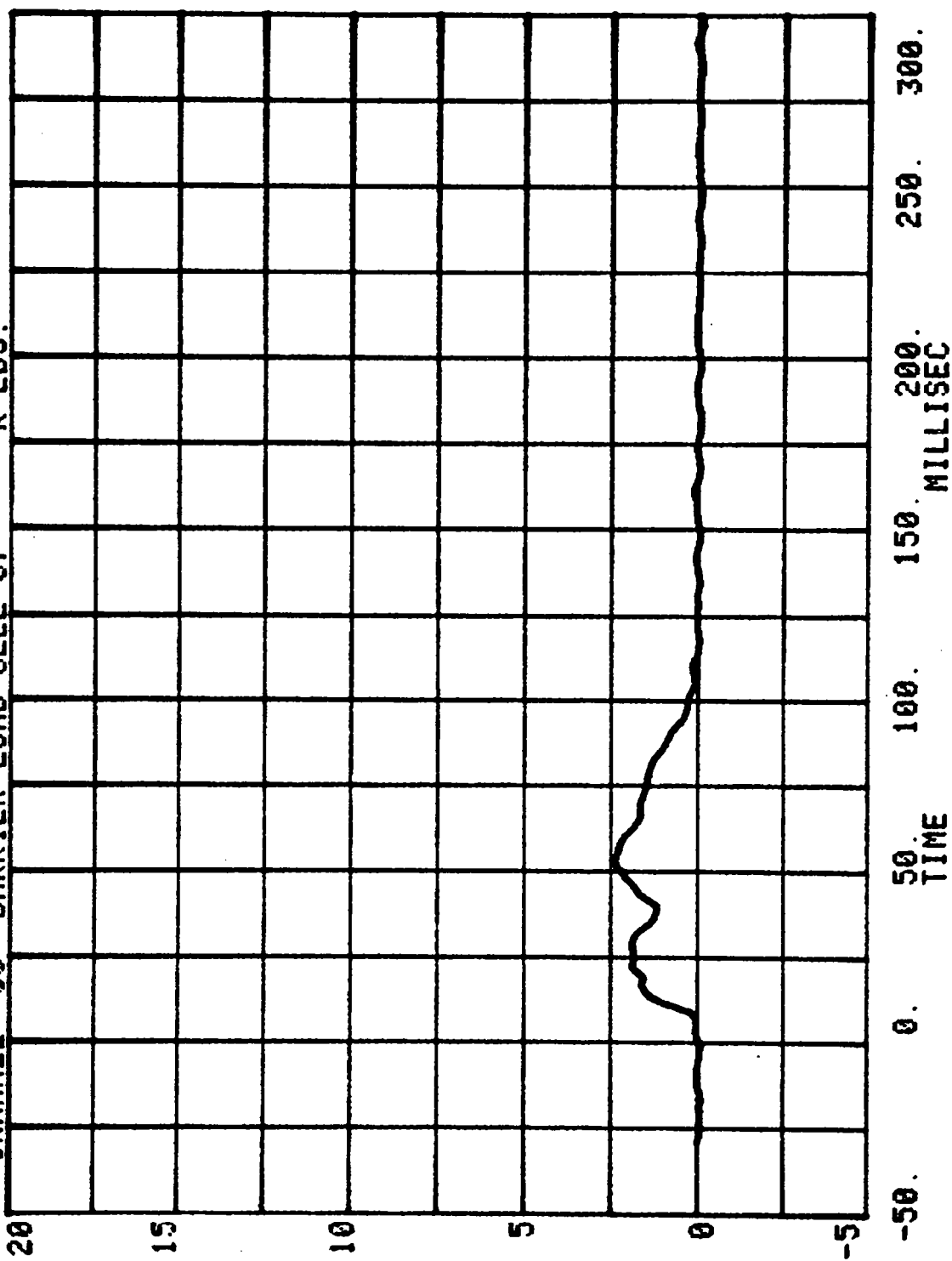


TIME
0. 50. 100. 150. 200. 250. 300.
MILLISEC.

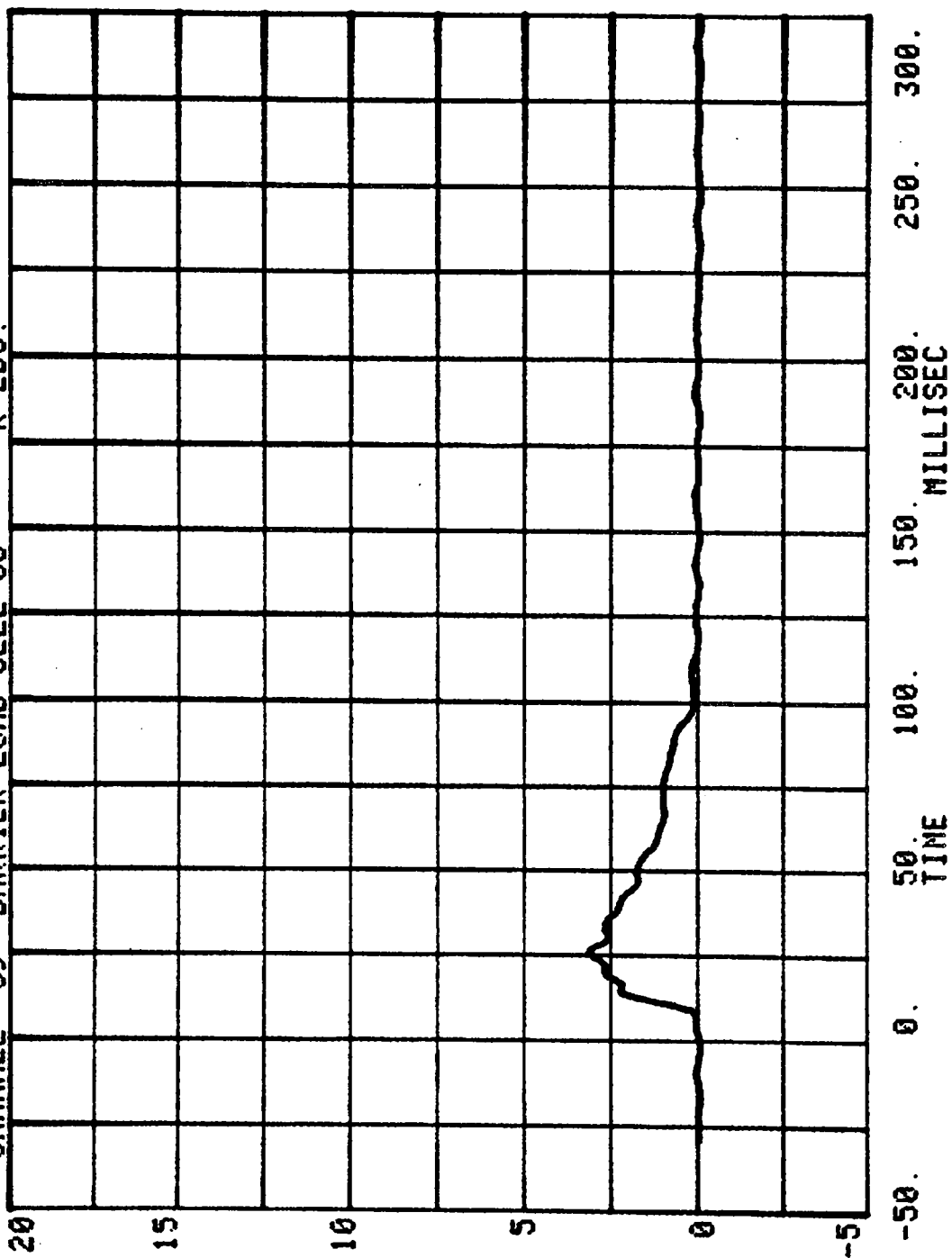
CHANNEL 57 RUN= 606 SERIES= 301
BARRIER LOAD CELL C6 K LBS.



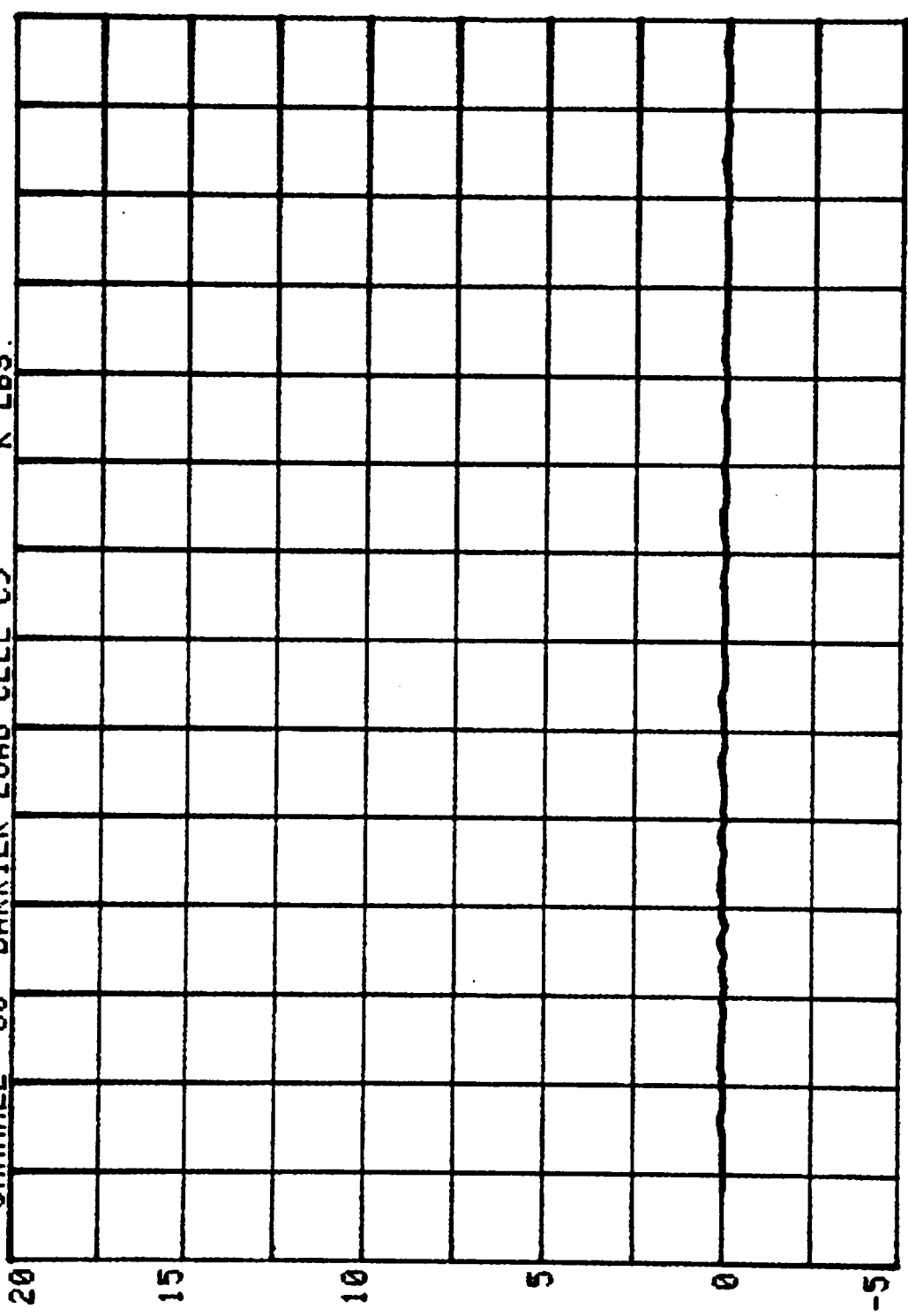
RUN= 606 SERIES= 301
CHANNEL 58 BARRIER LOAD CELL C7 K LBS.



CHANNEL 59 BARRIER LOAD CELL C8
RUN= 606 SERIES= 301 K LBS.

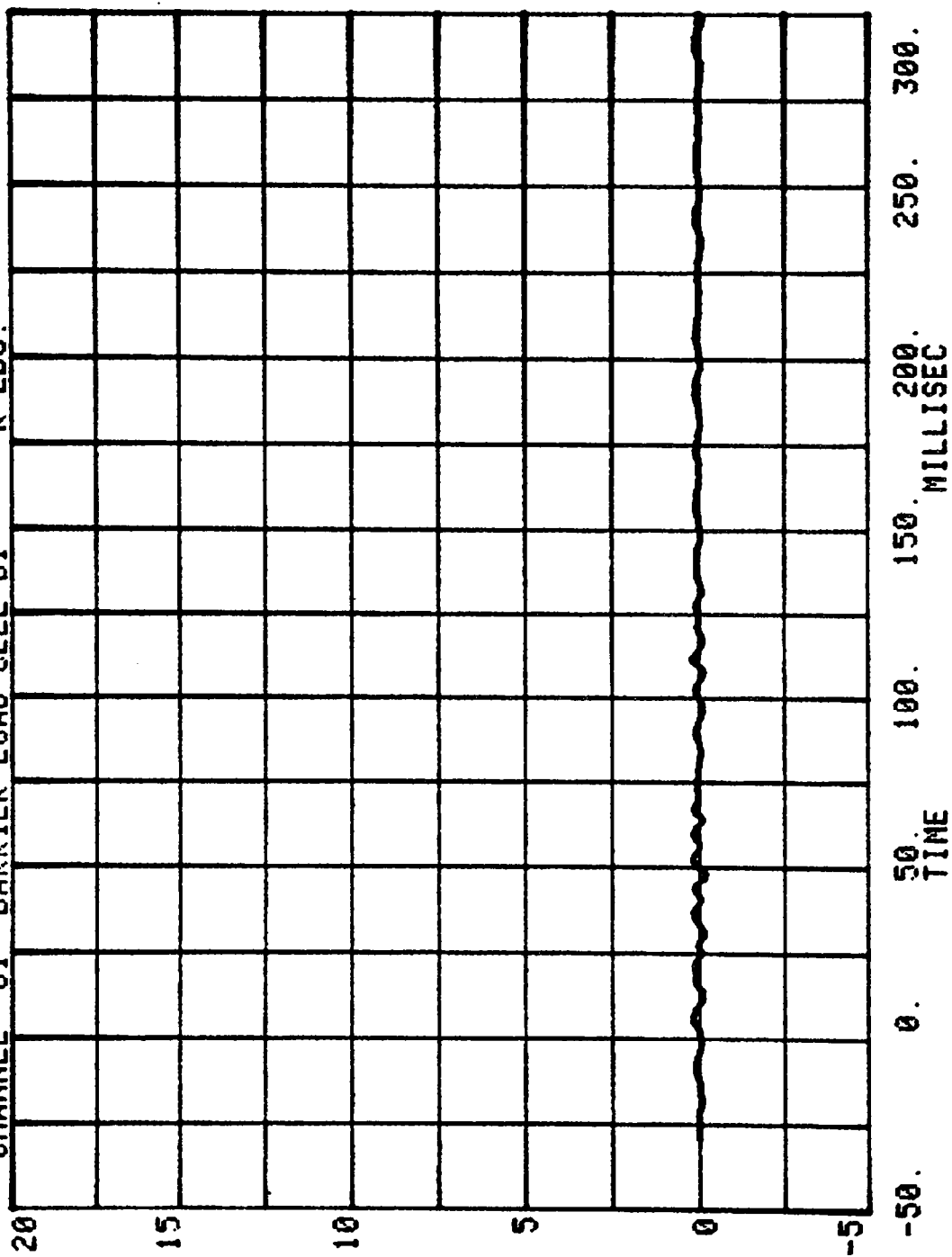


CHANNEL 60 BARRIER LOAD CELL C9 RUN= 606 SERIES= 301 K LBS.

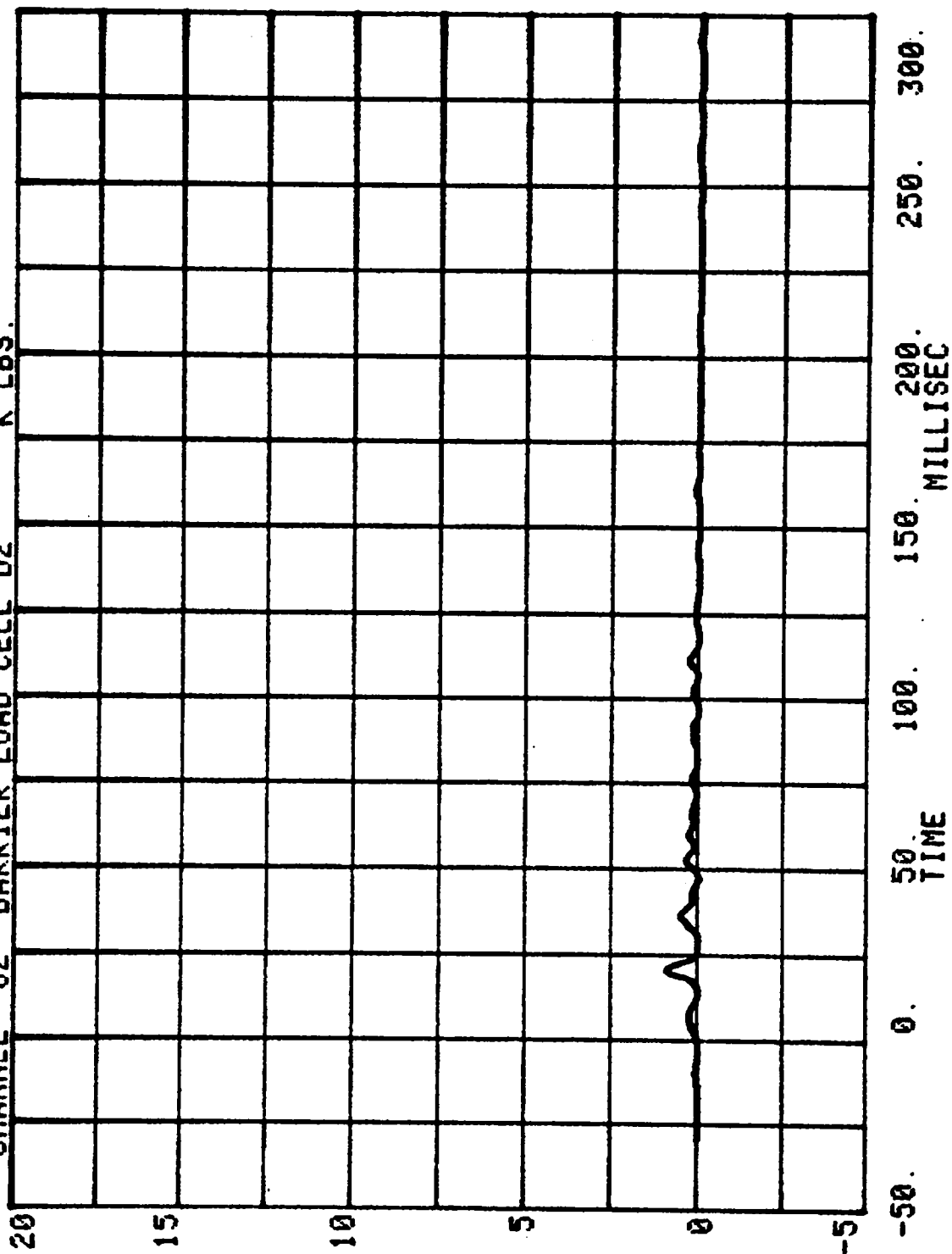


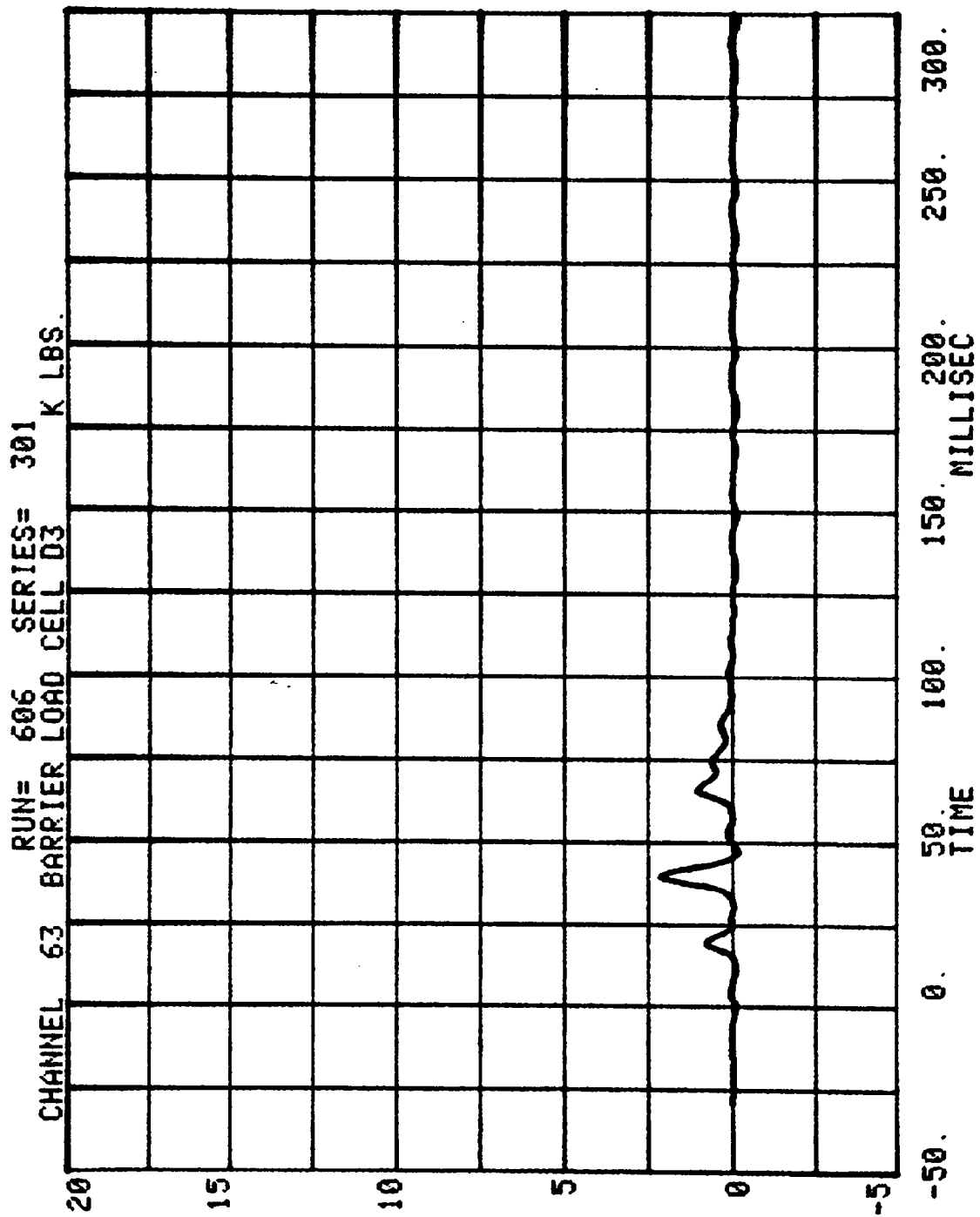
-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

CHANNEL 61 RUN= 606 SERIES= 301 K LBS.
BARRIER LOAD CELL D1

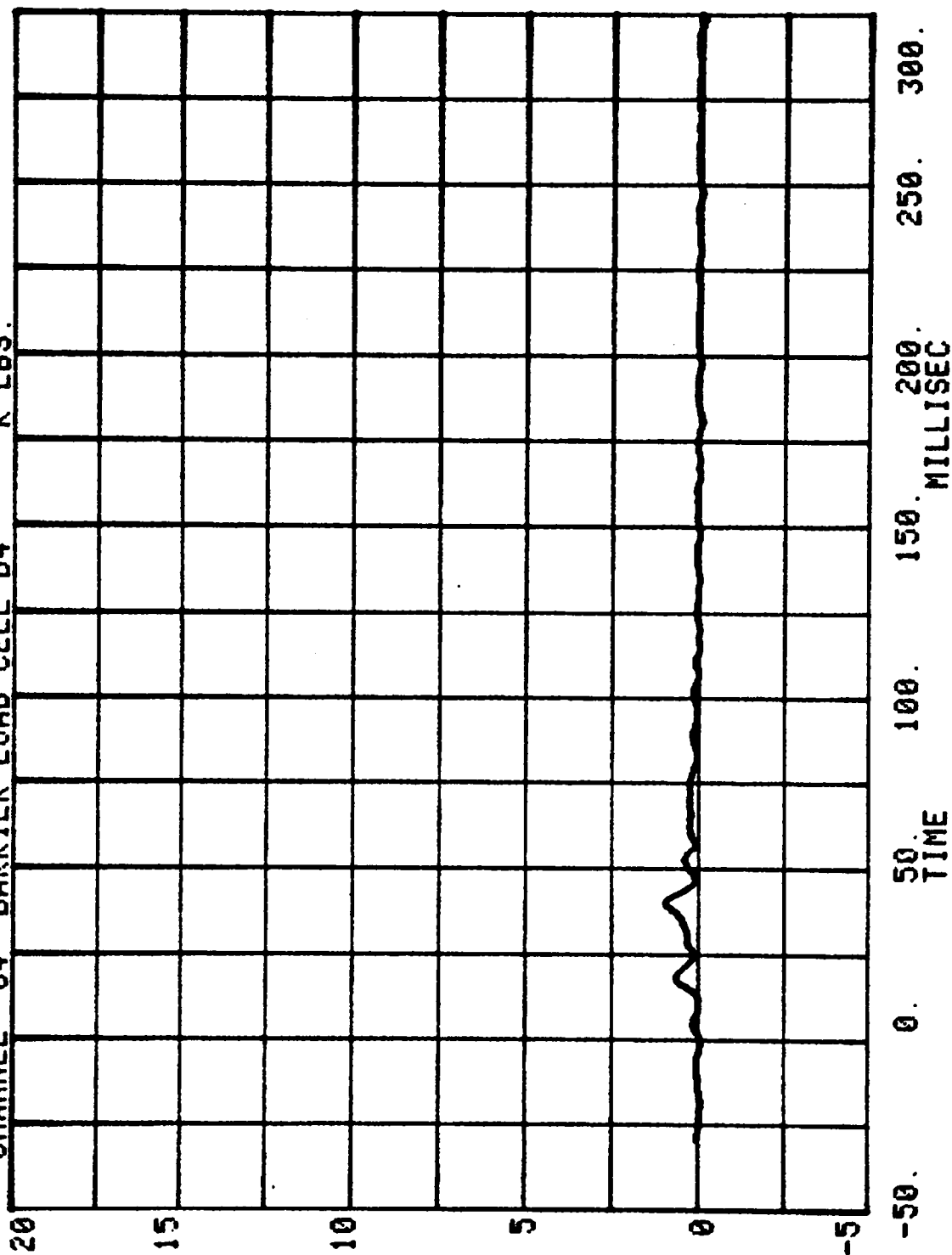


CHANNEL 62 BARRIER LOAD CELL 02 K LBS.
RUN= 606 SERIES= 301



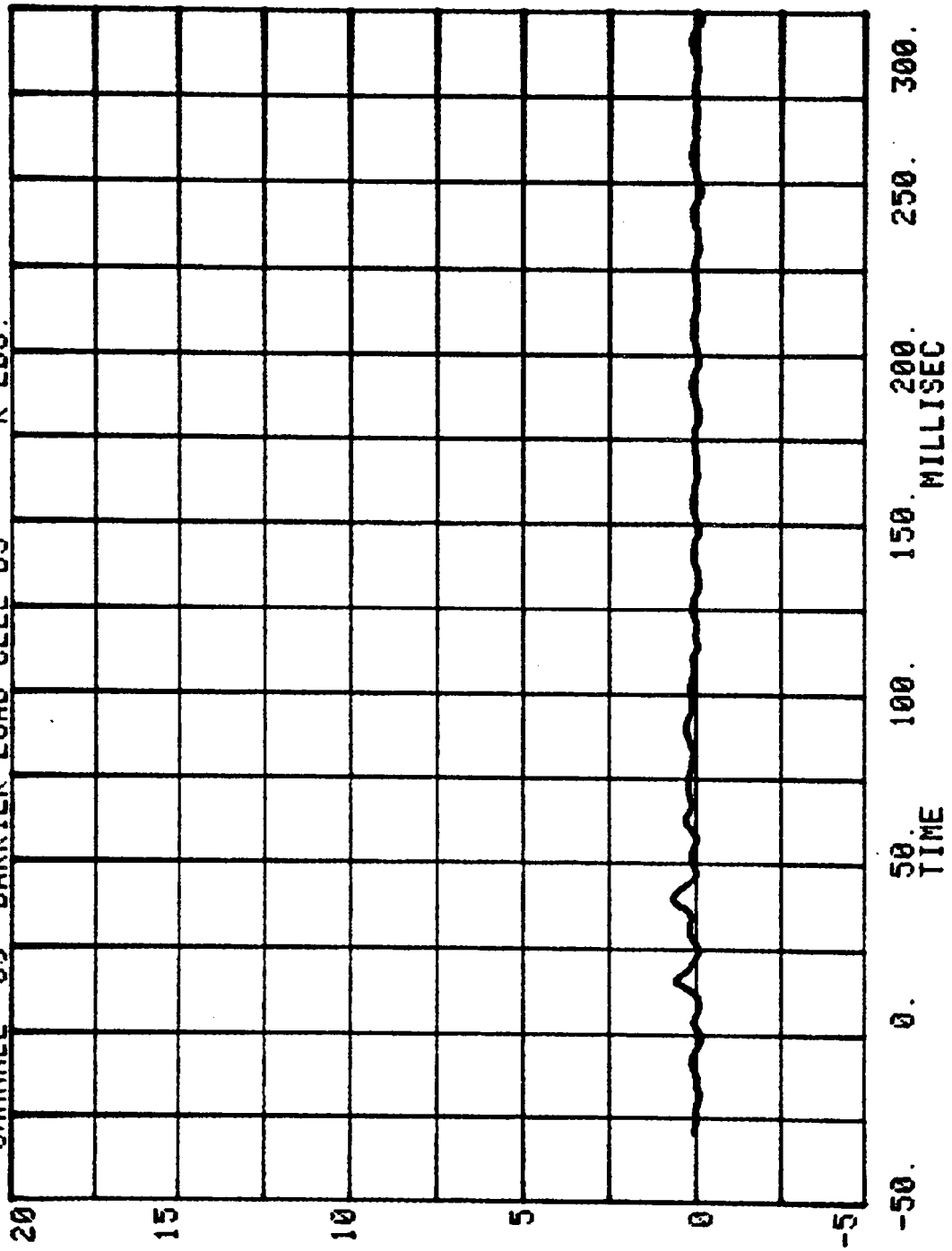


RUN= 606 SERIES= 301
CHANNEL 64 BARRIER LOAD CELL D4 K LBS.

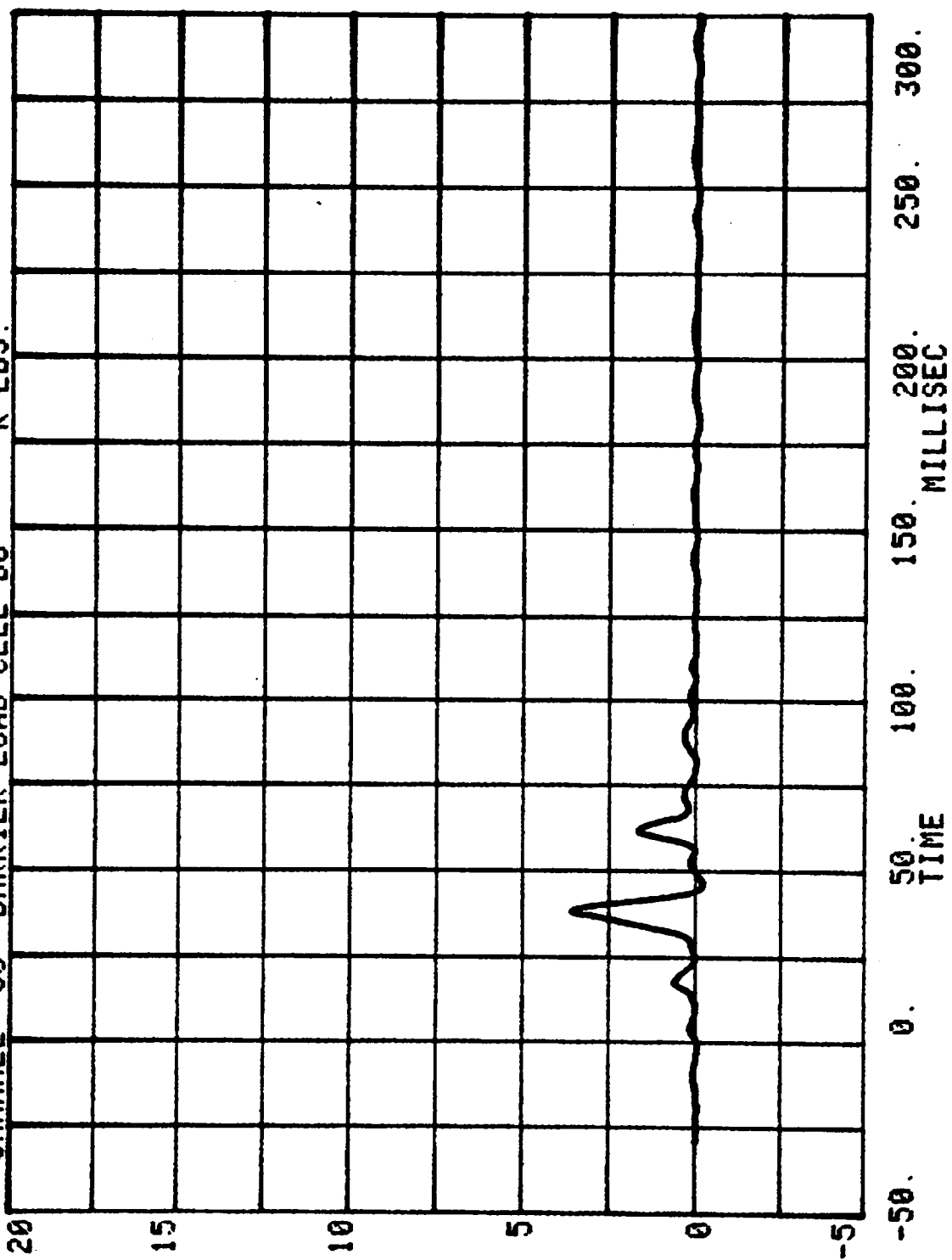


CHANNEL 65 BARRIER LOAD CELL 05 K LBS.

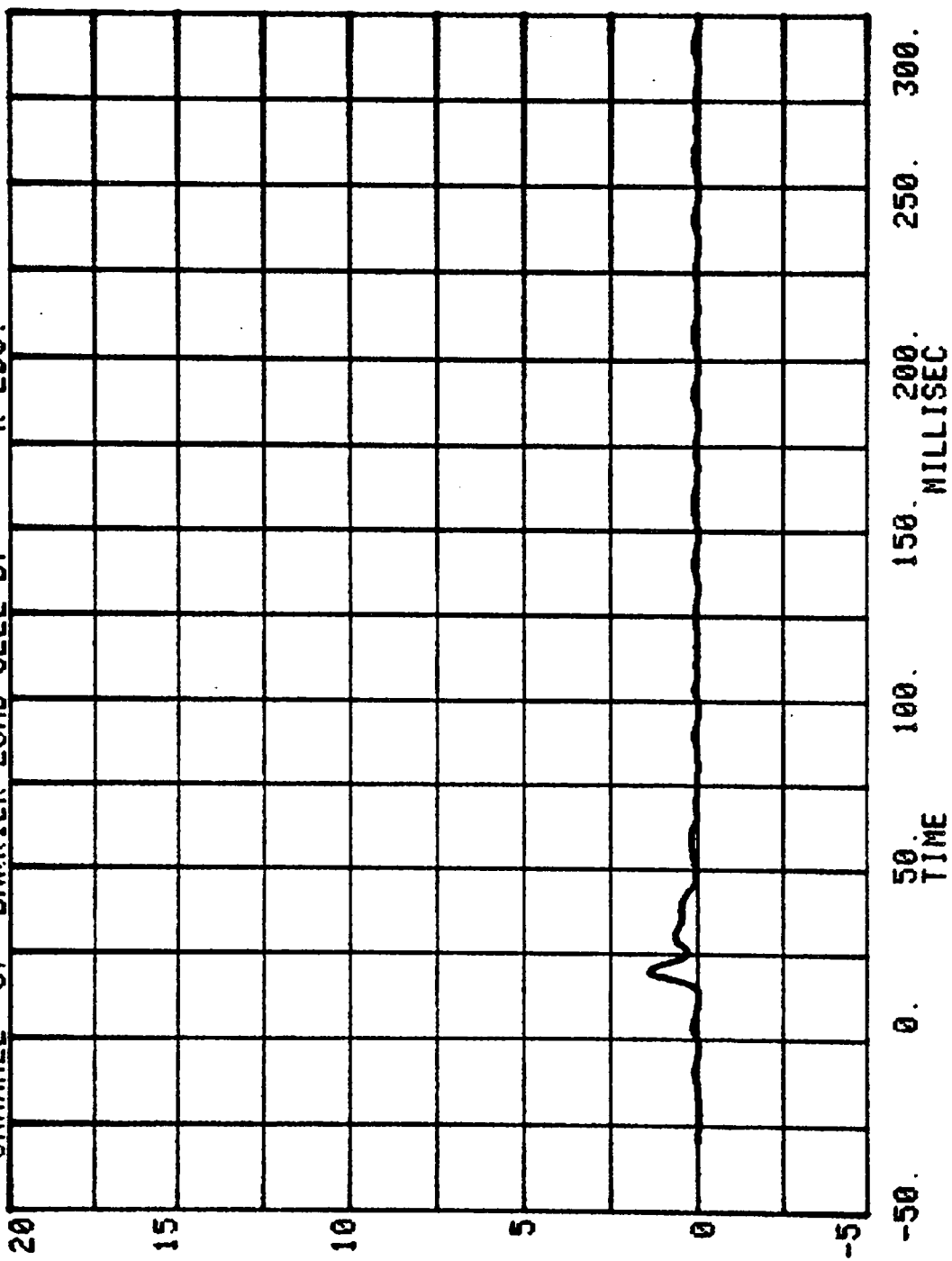
RUN= 606 SERIES= 301



RUN= 606 SERIES= 301
CHANNEL 66 BARRIER LOAD CELL D6 K LBS.

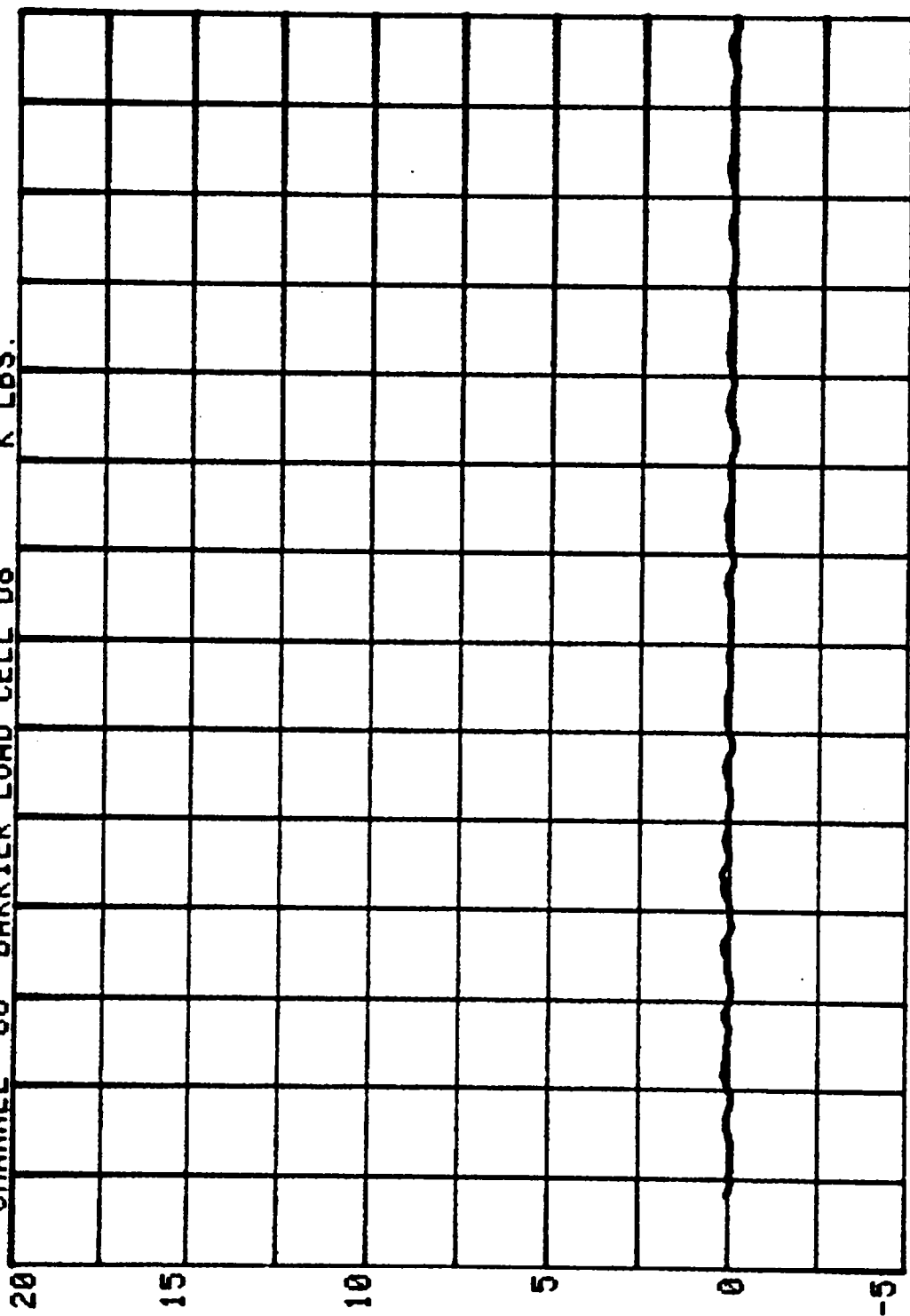


CHANNEL 67 BARRIER LOAD CELL D7
RUN= 606 SERIES= 301
K LBS.



CHANNEL 68 BARRIER LOAD CELL 08 K LBS.

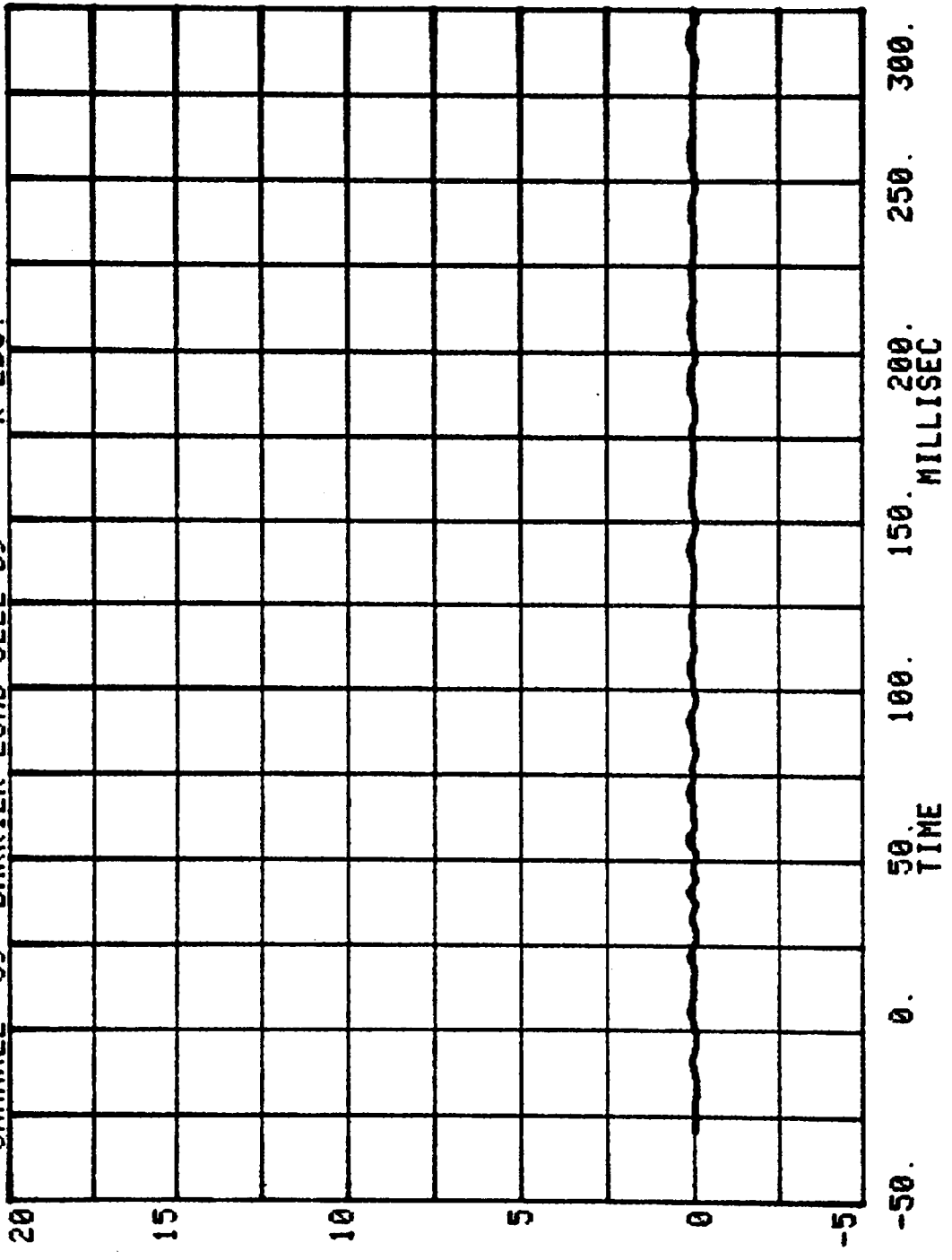
RUN= 606 SERIES= 301

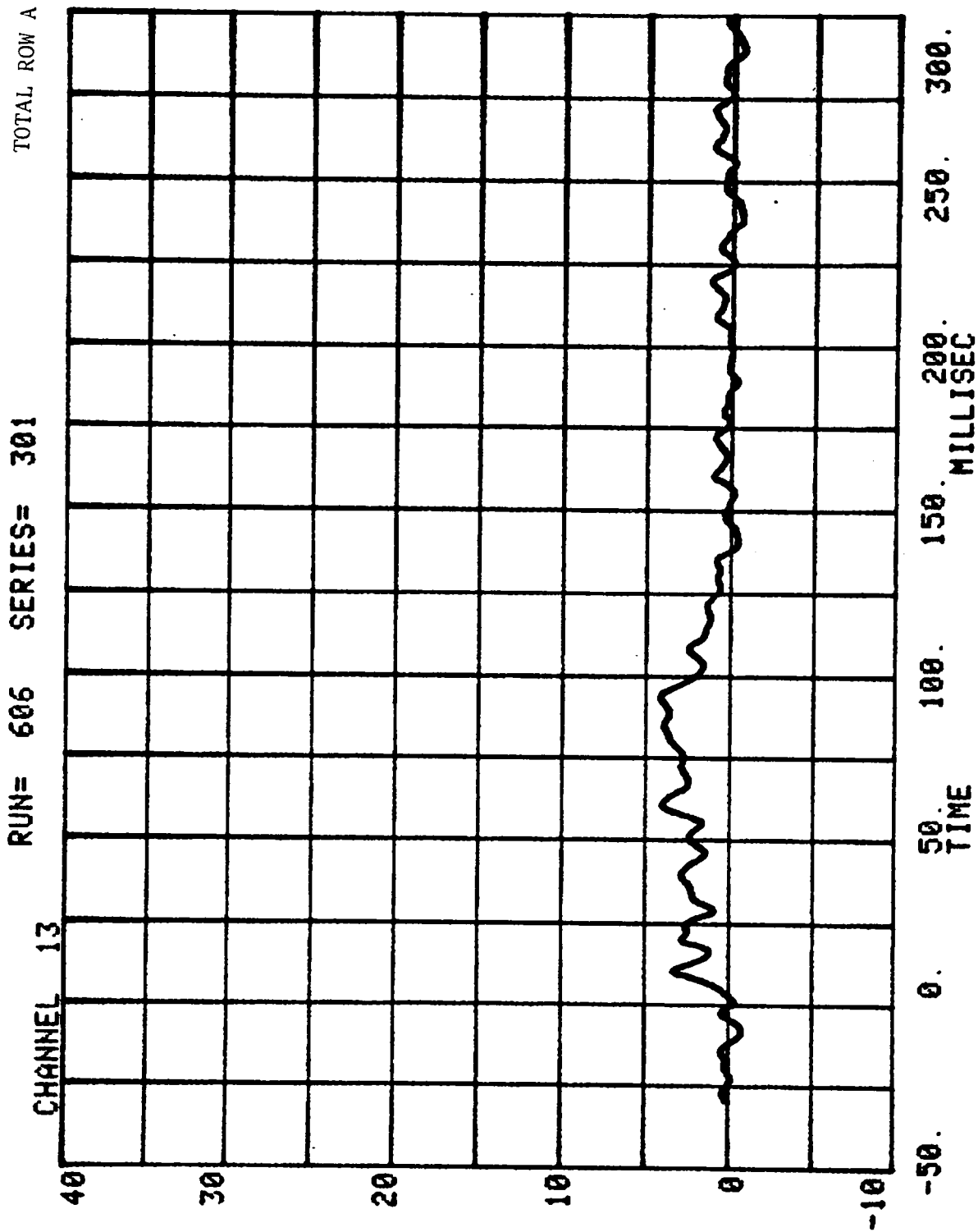


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 69 BARRIER LOAD CELL D9 K LBS.

RUN= 606 SERIES= 301

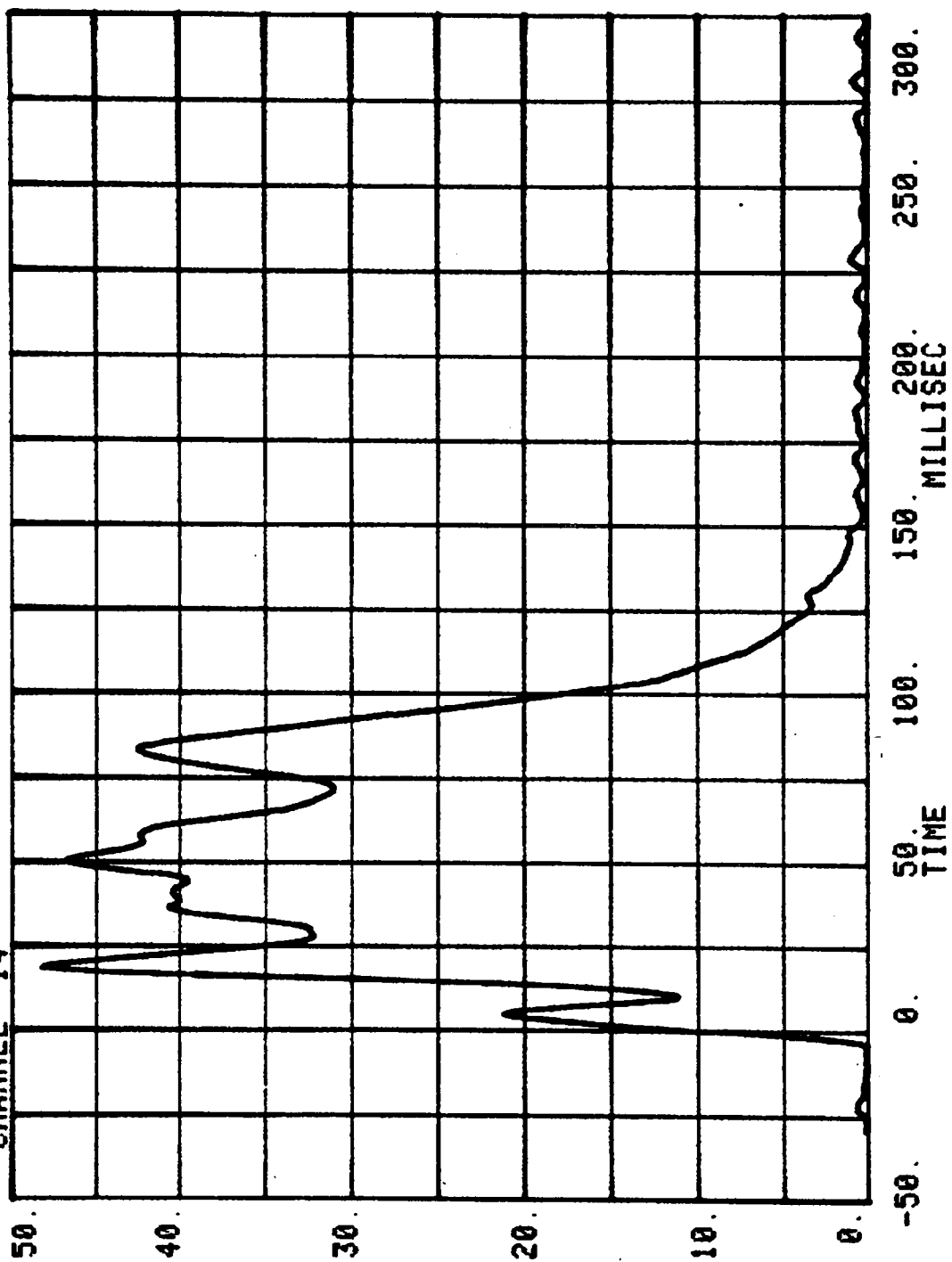




TOTAL ROW B

RUN= 606 SERIES= 301

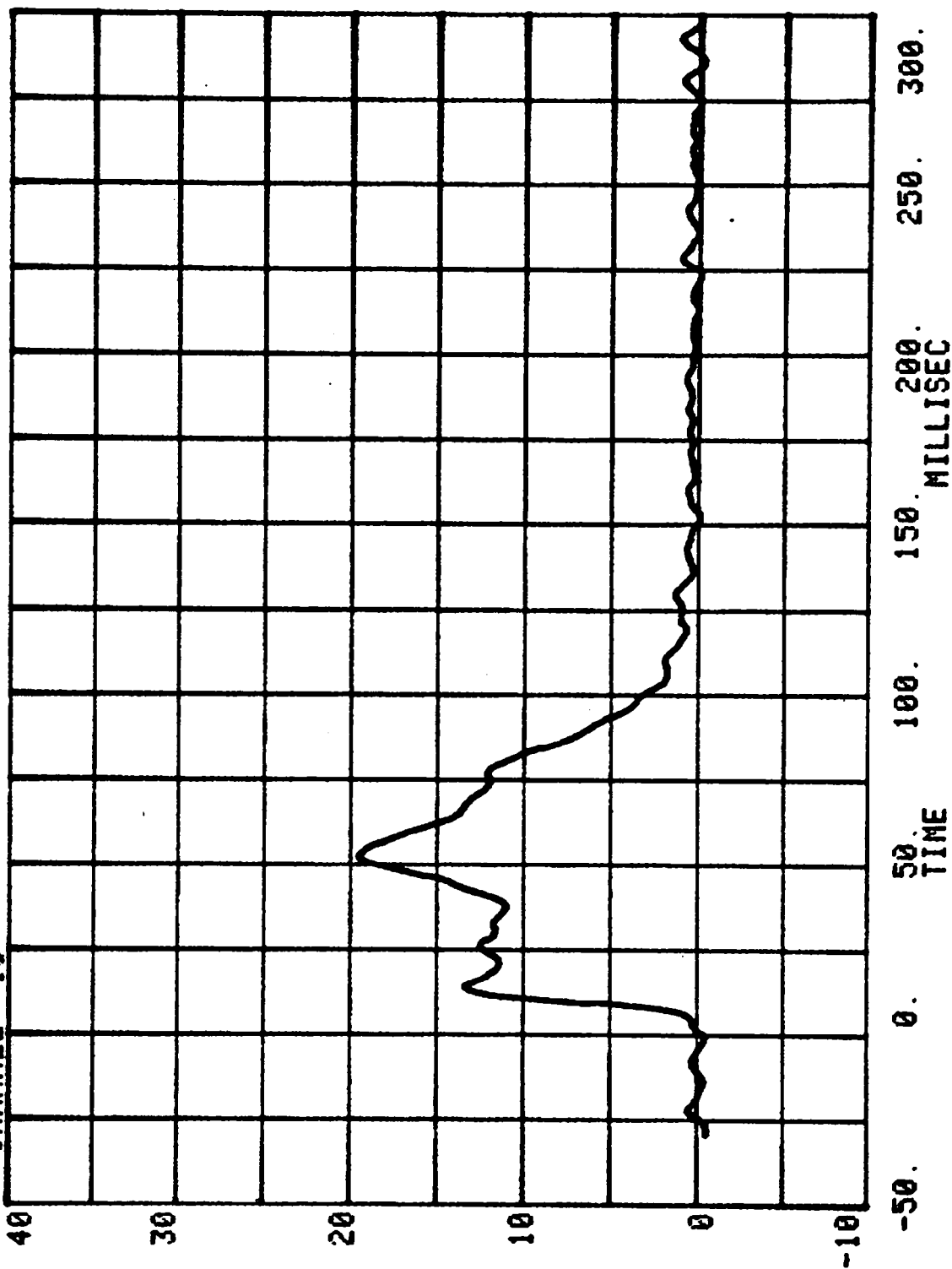
CHANNEL 14



TOTAL ROW C

RUN= 606 SERIES= 301

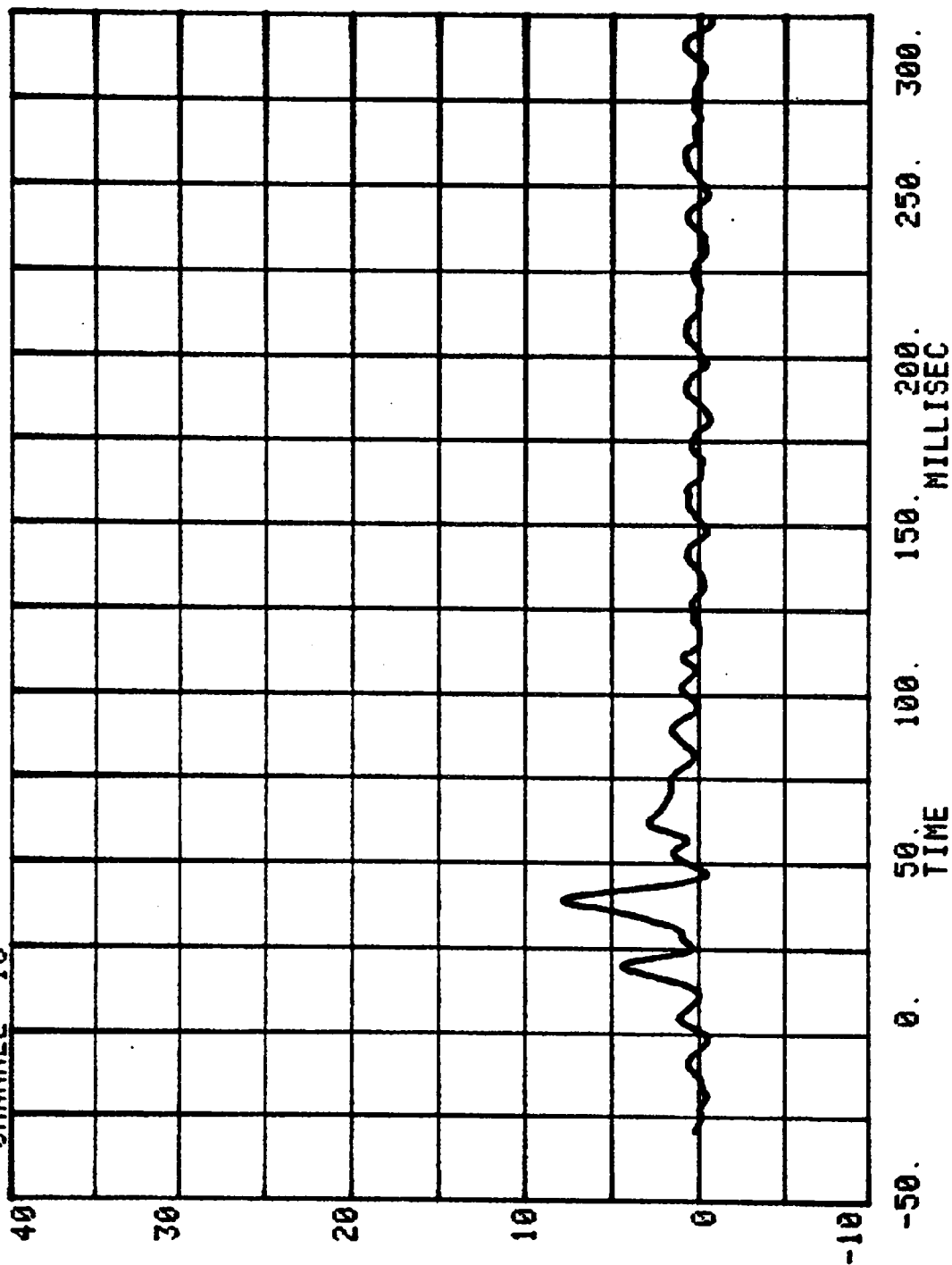
CHANNEL 15

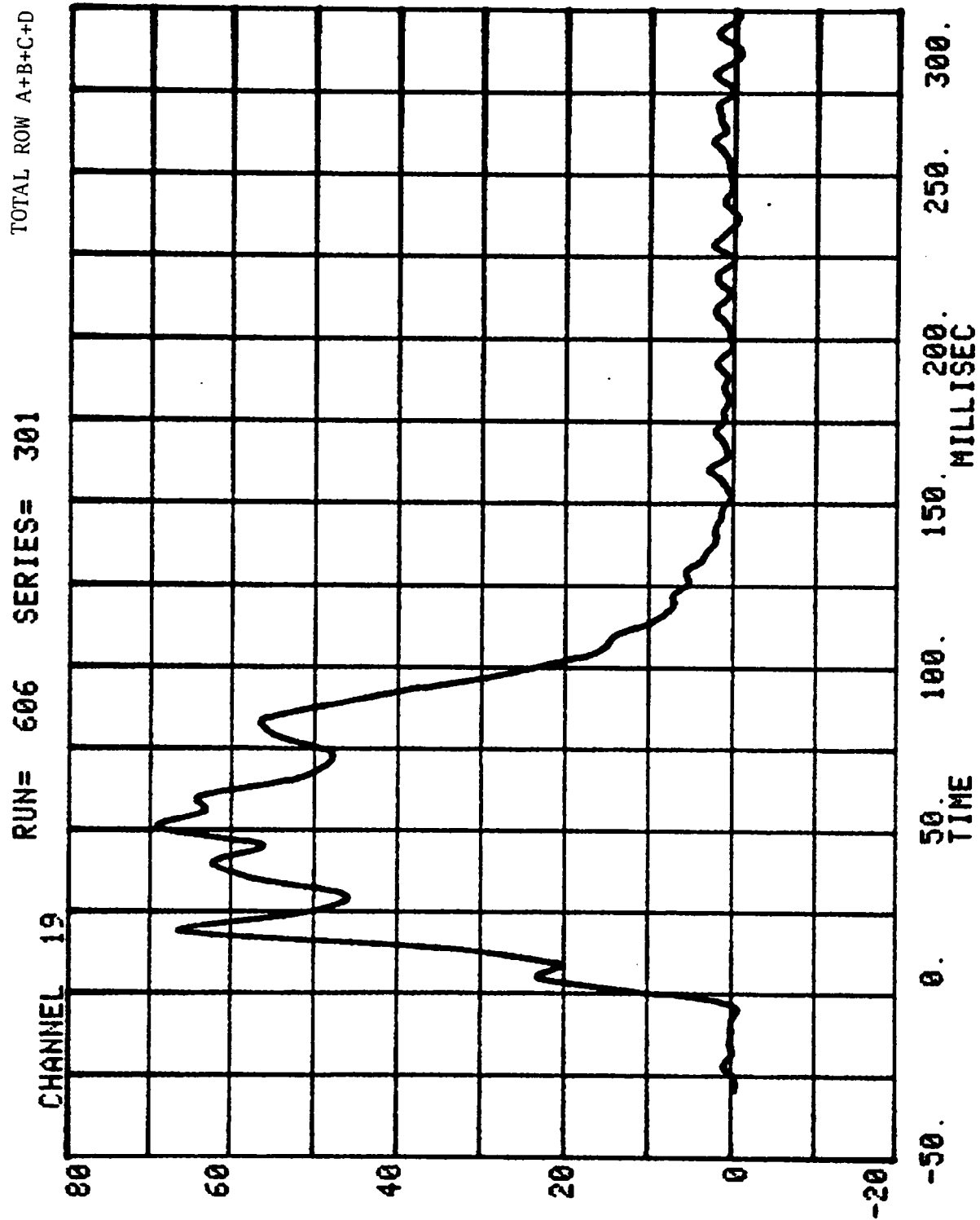


TOTAL ROW D

RUN= 606 SERIES= 301

CHANNEL 16





TEST NO. CE0301

DUMMY DATA

	FILTER CHANNEL CLASS
HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
FEMUR FORCES	600
BELT LOADS	60

HEAD INJURY CRITERION
HEAD SEVERITY INDEX

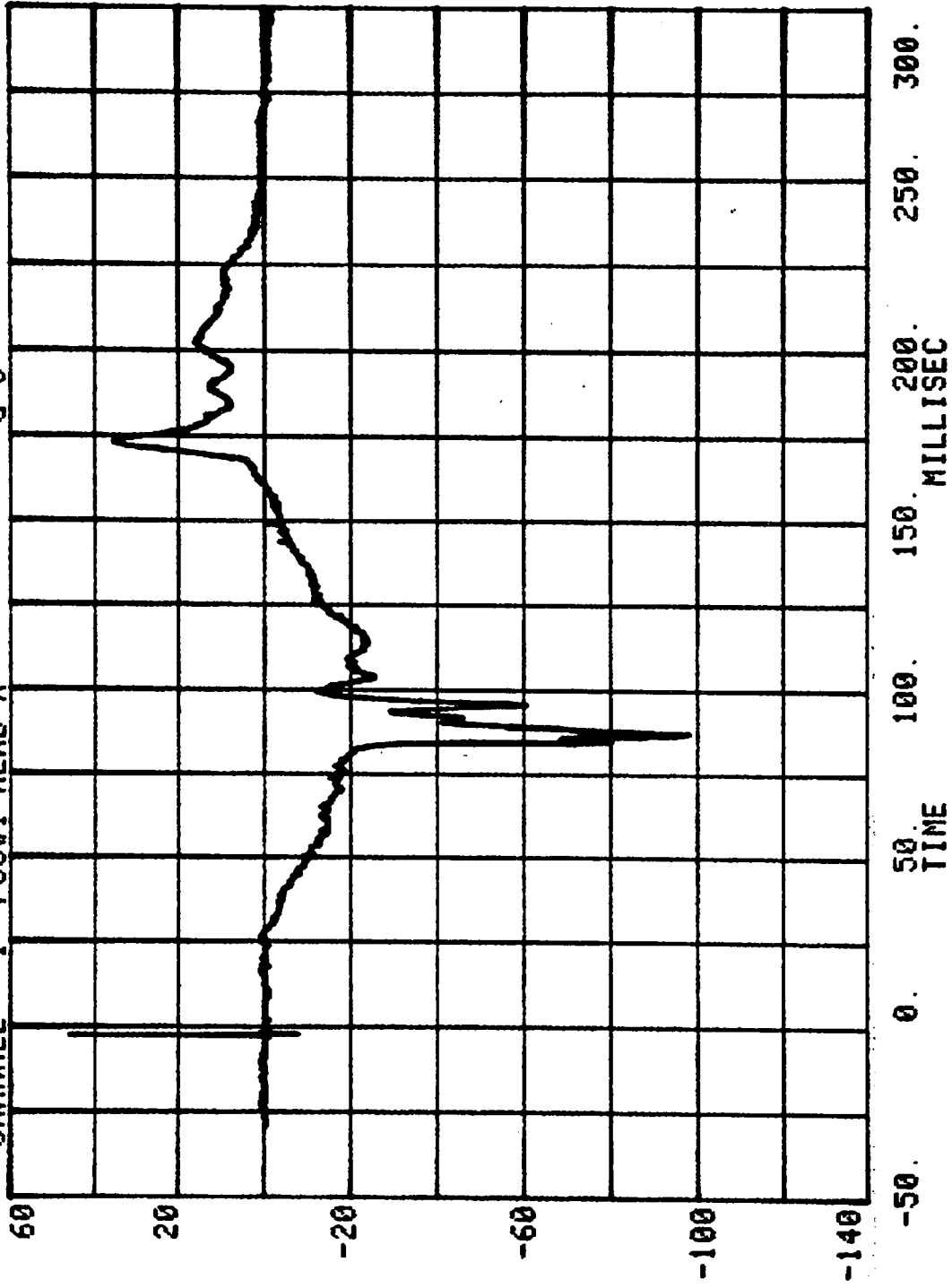
CAR TO LOAD CELL BARRIER

RUN= 606

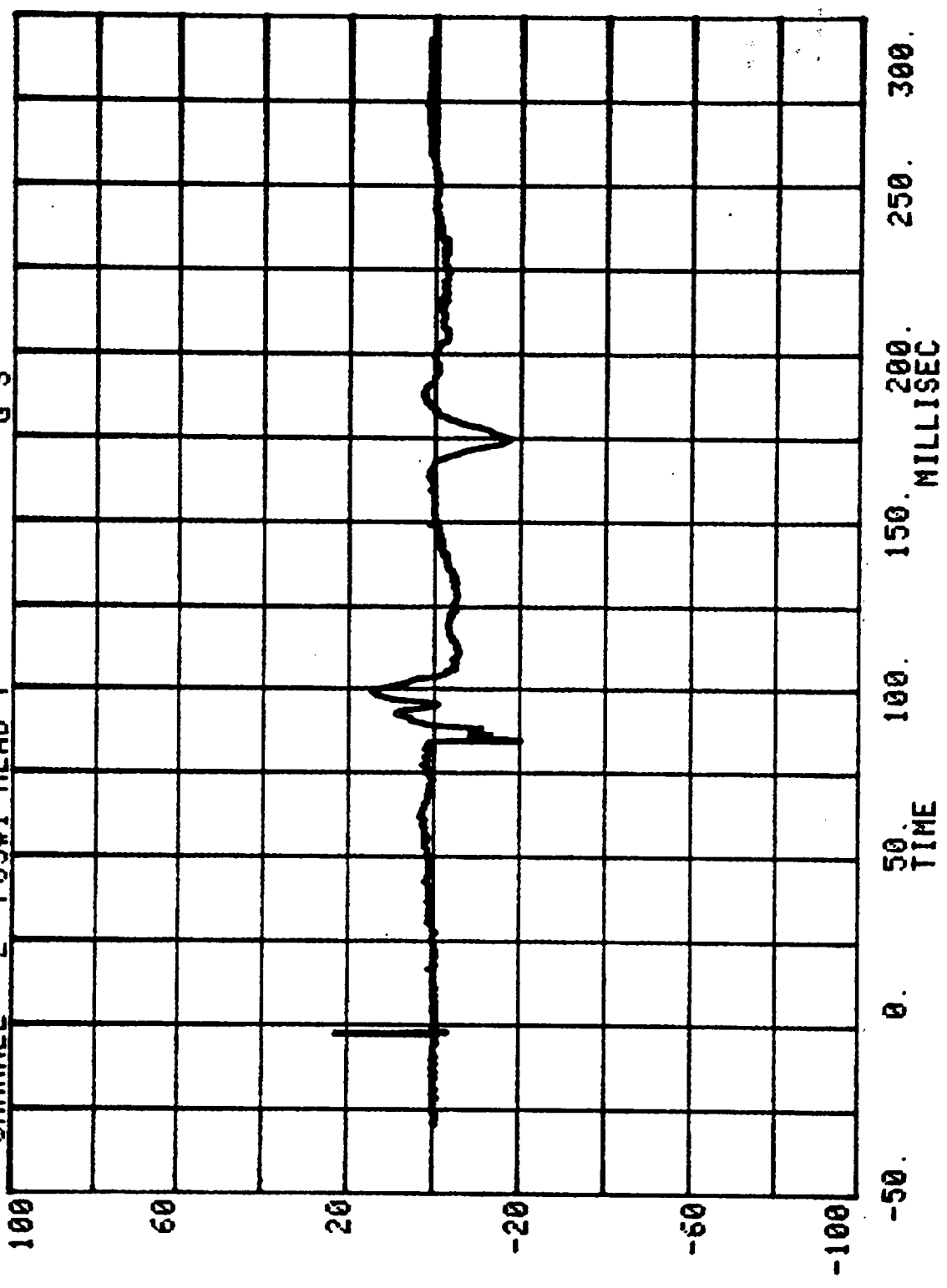
POS#1 HEAD RESULTANT

HIC= 507.2 FROM T1= .05610 TO T2= .11715
AVERAGE ACCELERATION BETWEEN T1 AND T2= 37.0G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 862.0

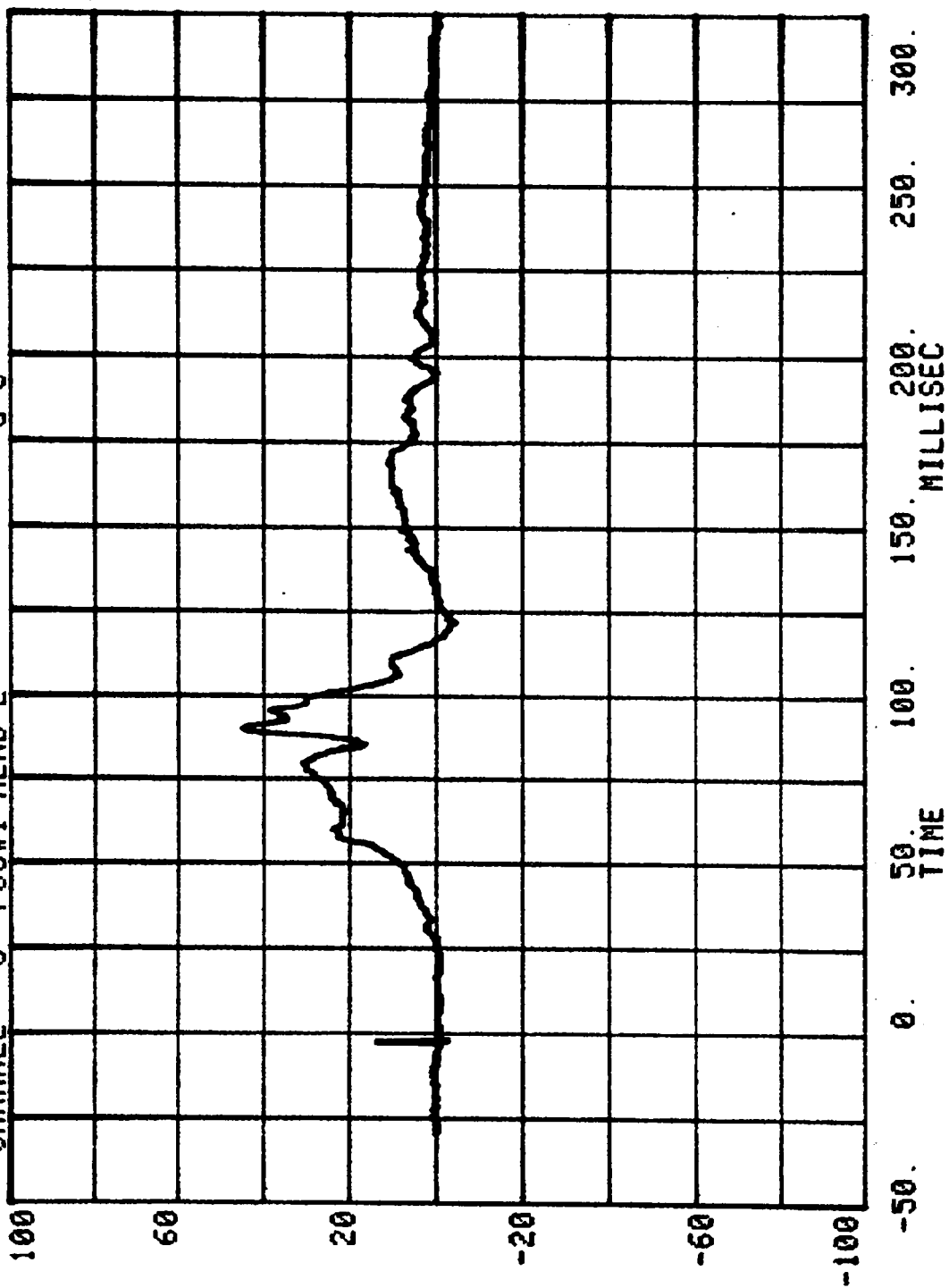
CHANNEL 1 POS#1 HEAD X RUN= 606 SERIES= 301 G'S



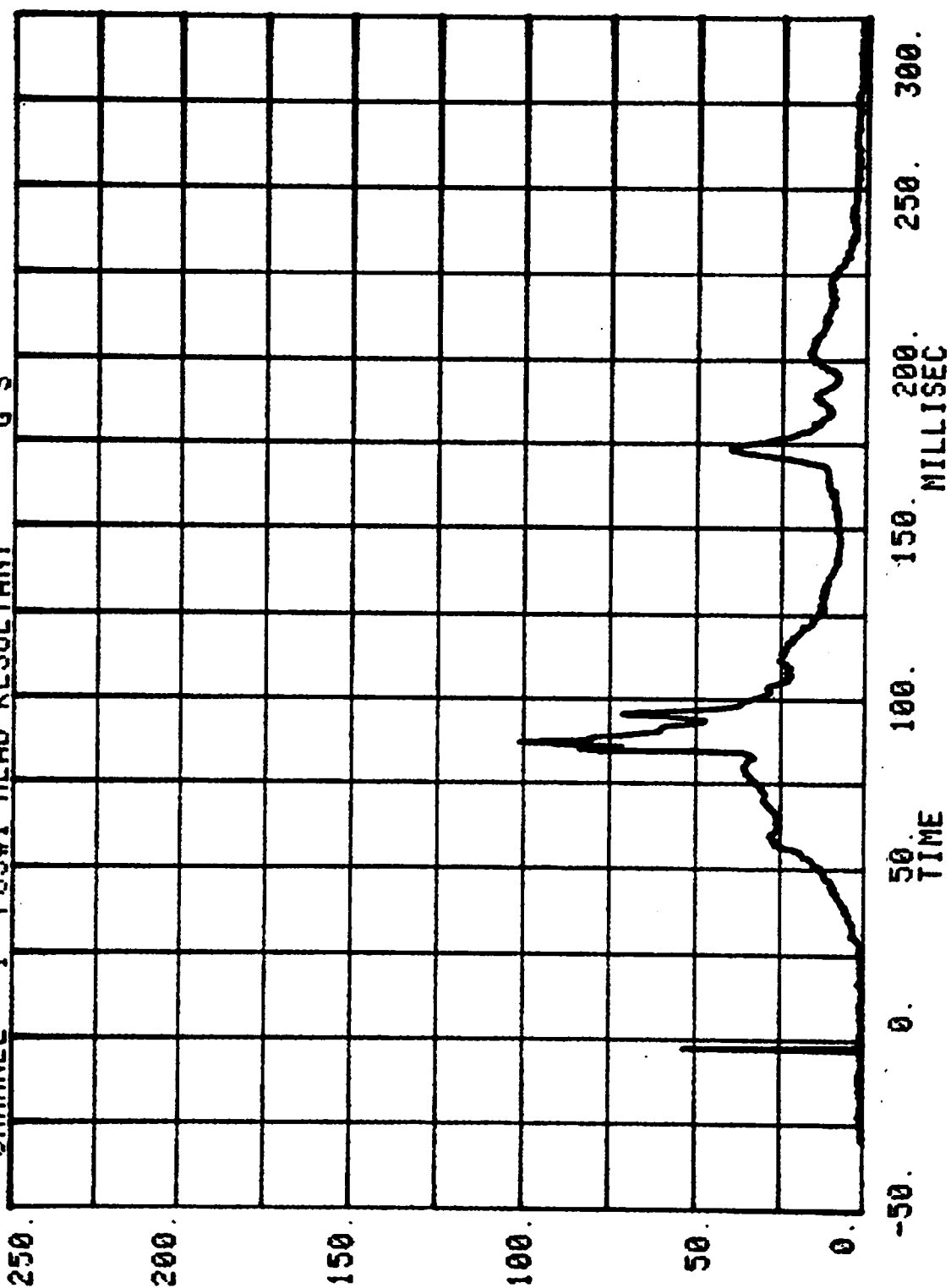
CHANNEL 2 POS#1 HEAD Y RUN= 606 SERIES= 301 G'S

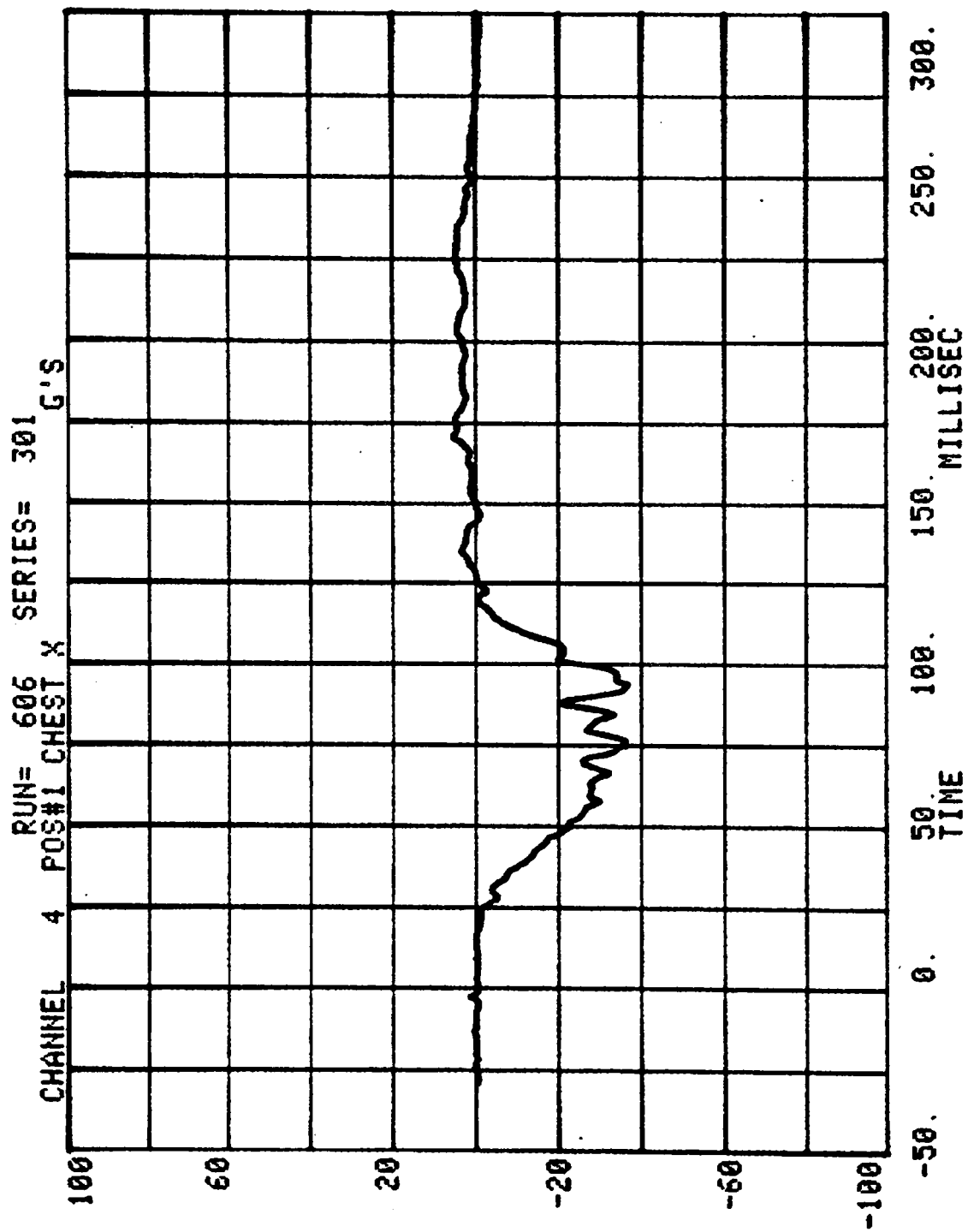


CHANNEL 3 POS#1 HEAD Z RUN= 606 SERIES= 301 G'S

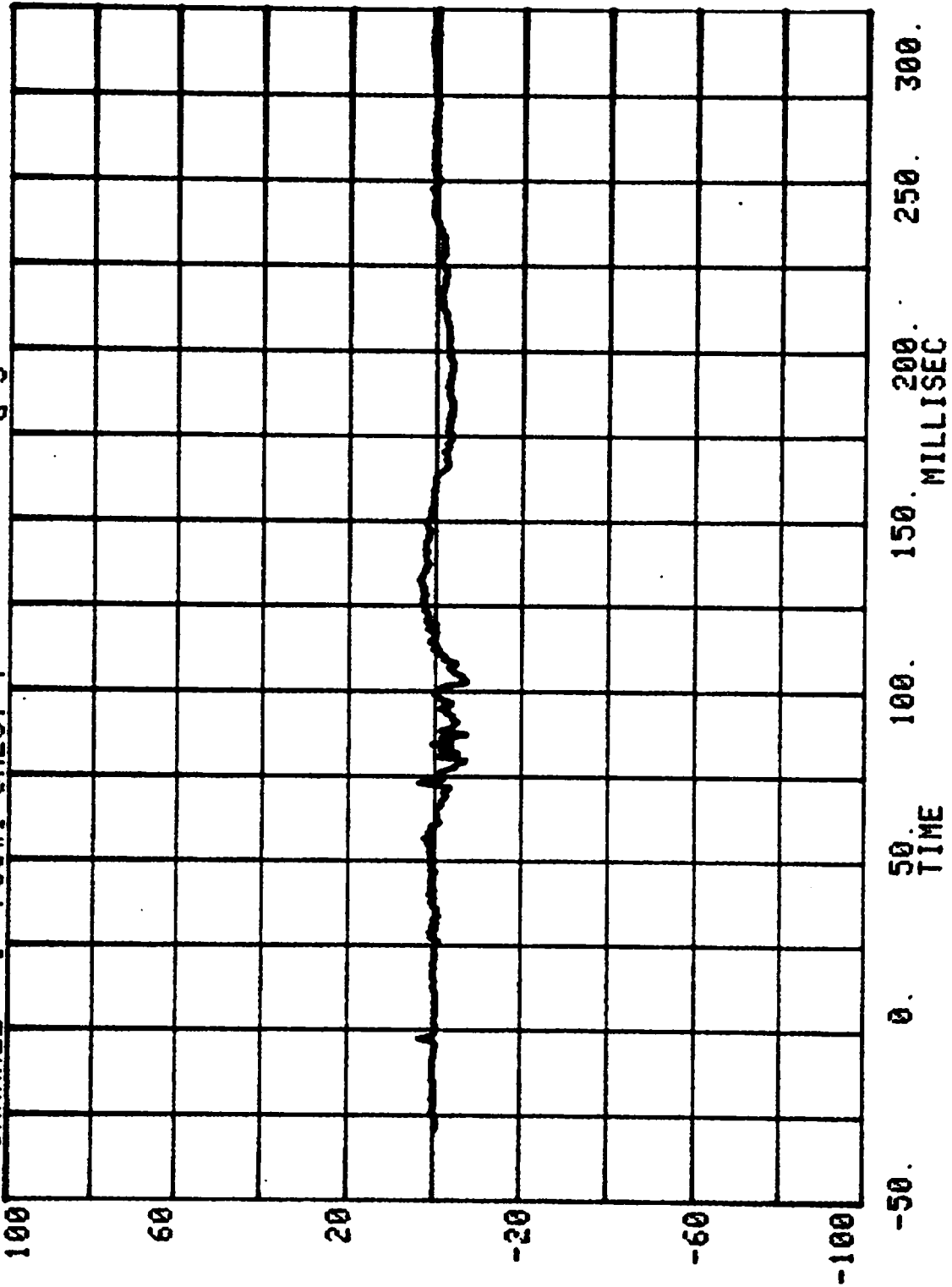


CHANNEL 1 RUN= 606 SERIES= 301
POS#1 HEAD RESULT G'S

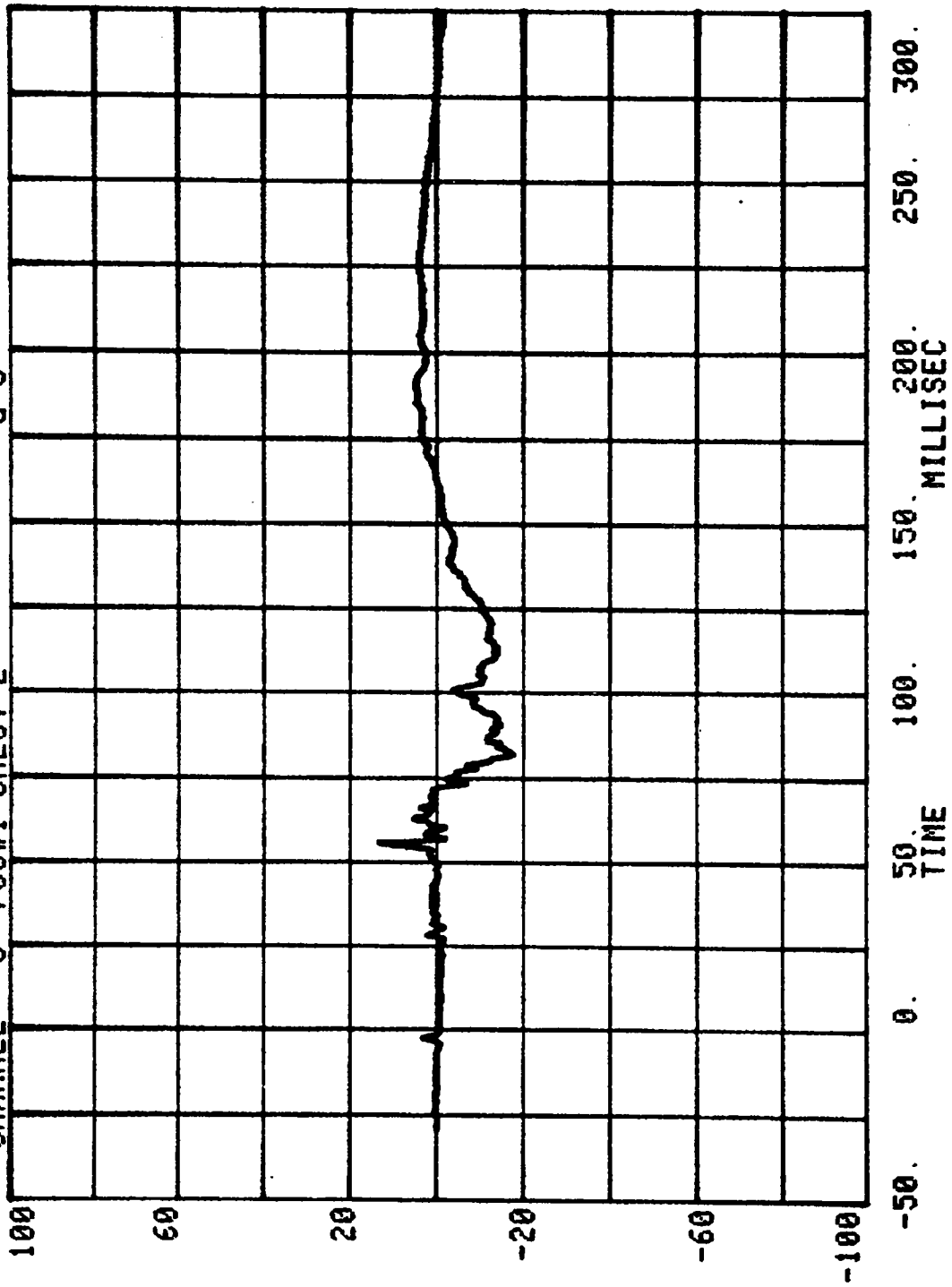




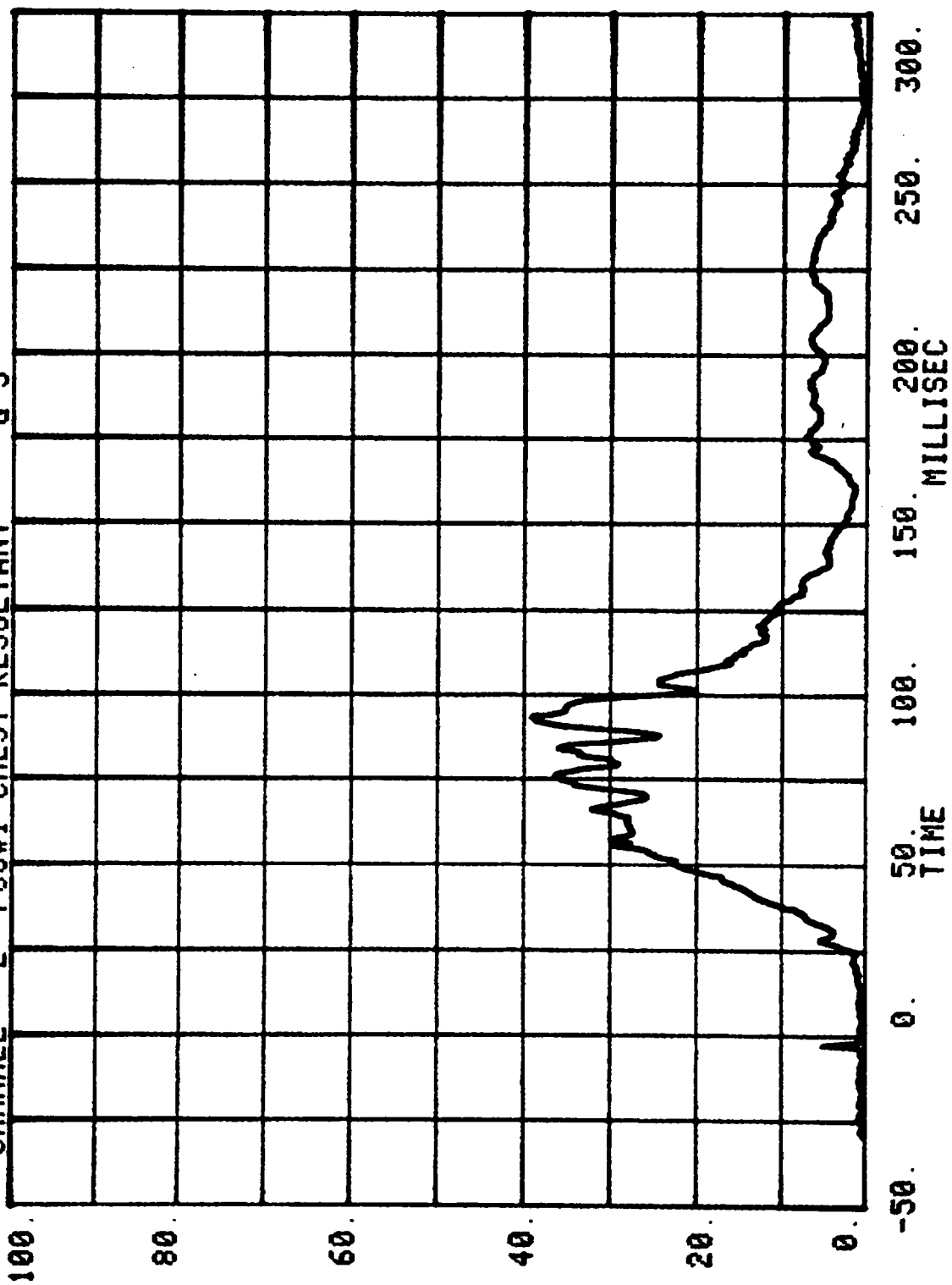
CHANNEL 5 POS#1 CHEST Y
RUN= 606 SERIES= 301 G'S

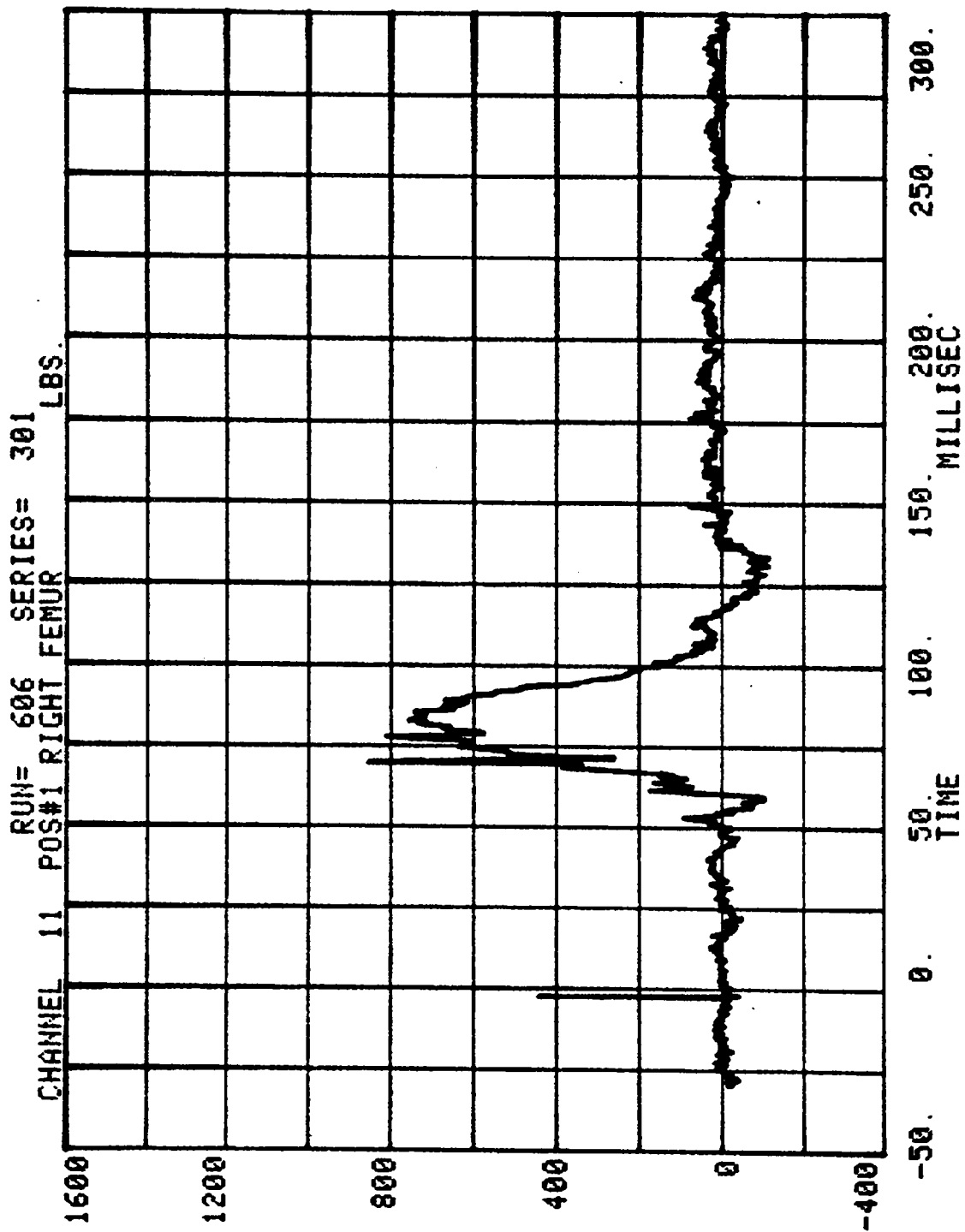


CHANNEL 6 POS#1 CHEST Z RUN= 606 SERIES= 301 G'S



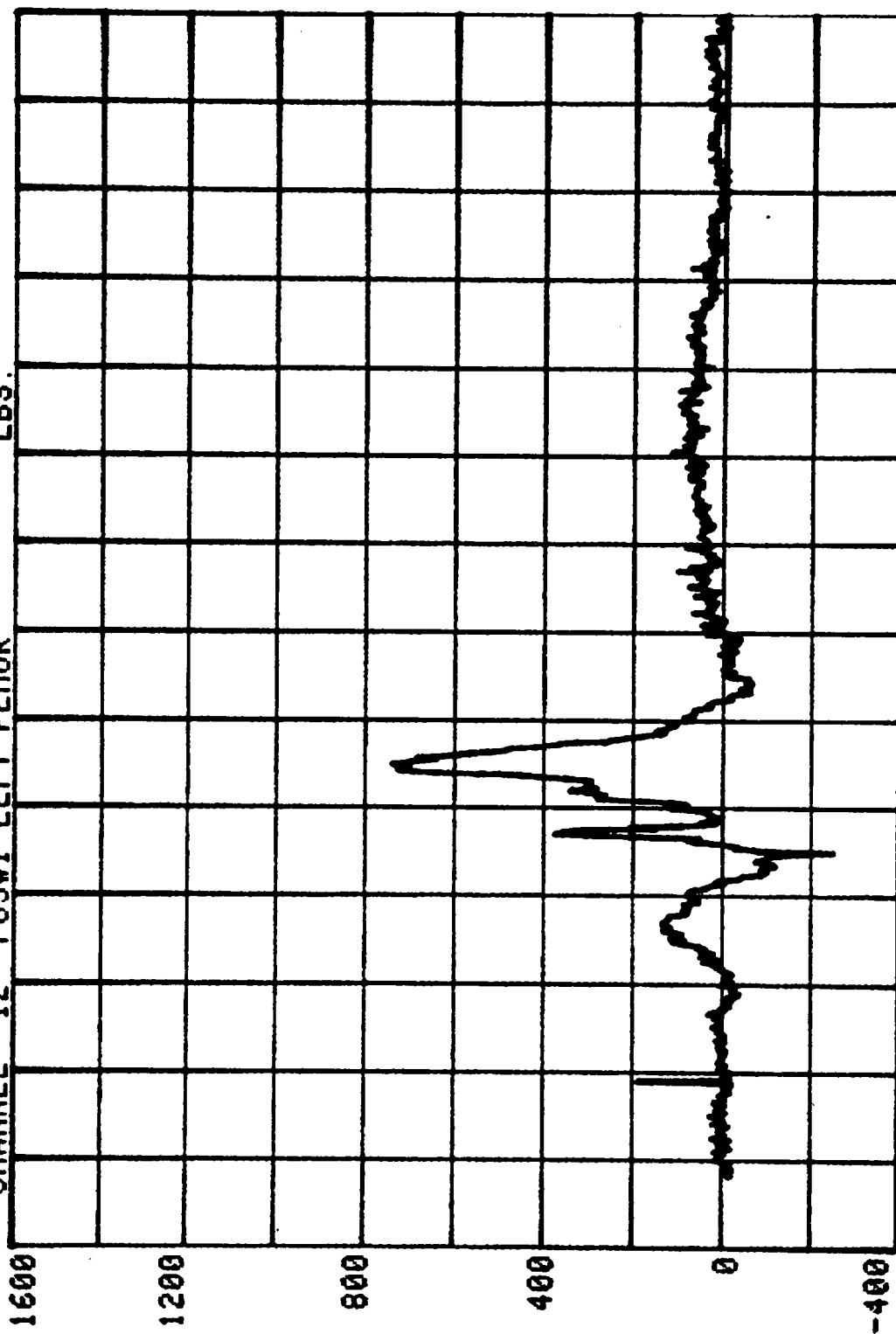
CHANNEL 2 RUN= 606 SERIES= 301
POS#1 CHEST RESULTANT G'S





CHANNEL 12 POS#1 LEFT FEMUR LBS.

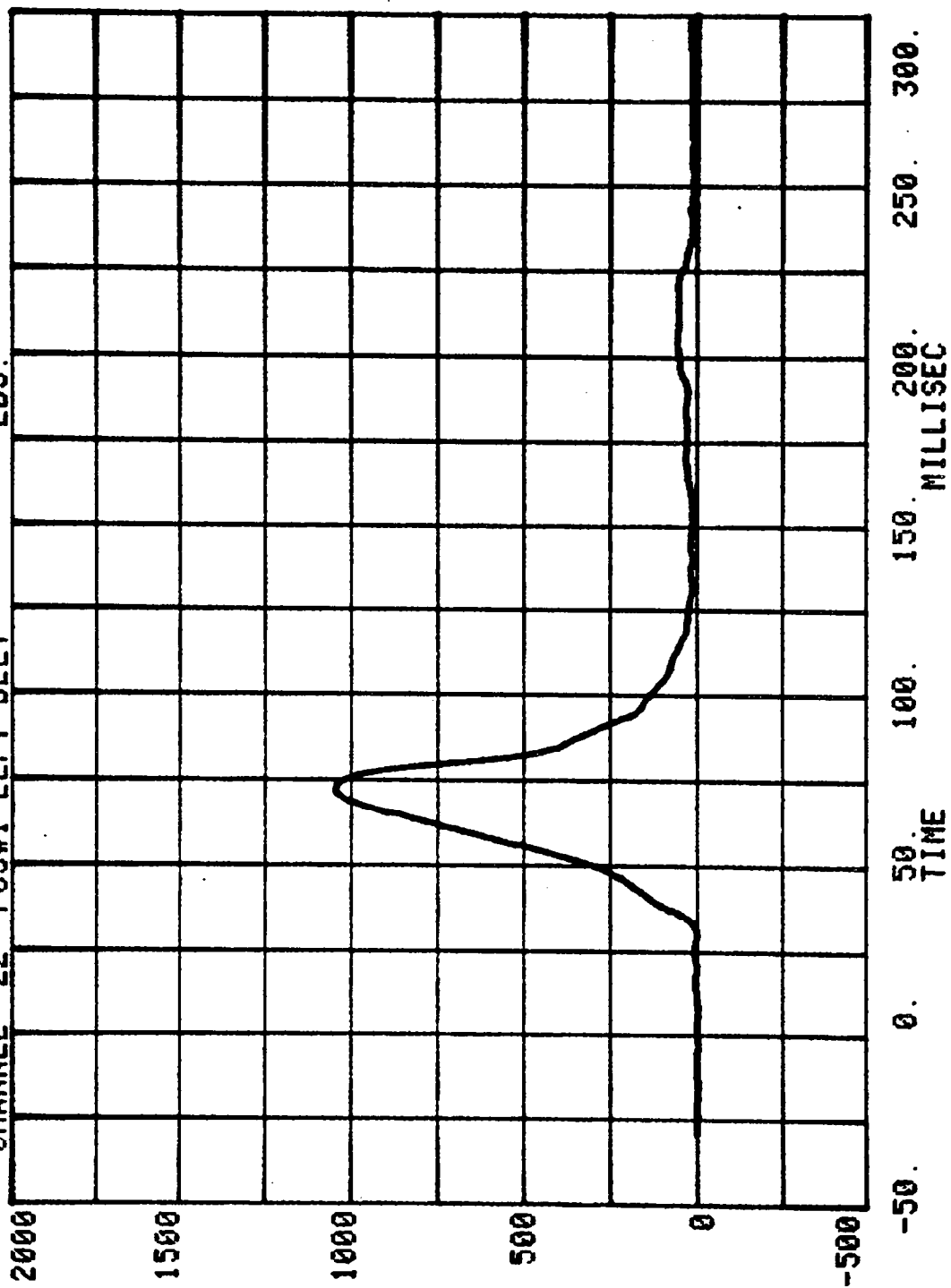
RUN= 606 SERIES= 301

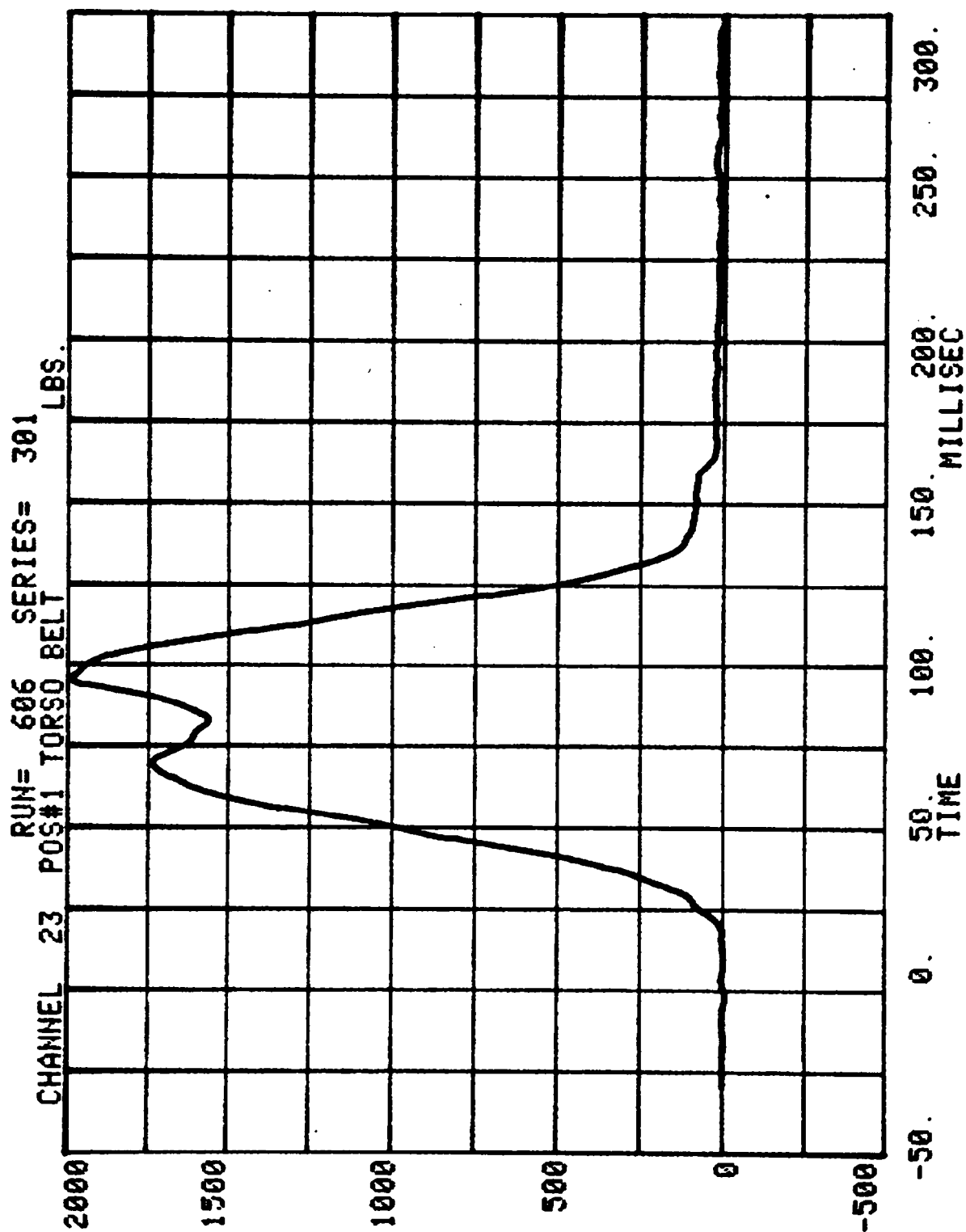


CHANNEL 22 POS#1 LEFT BELT

RUN= 606 SERIES= 301

LBS.

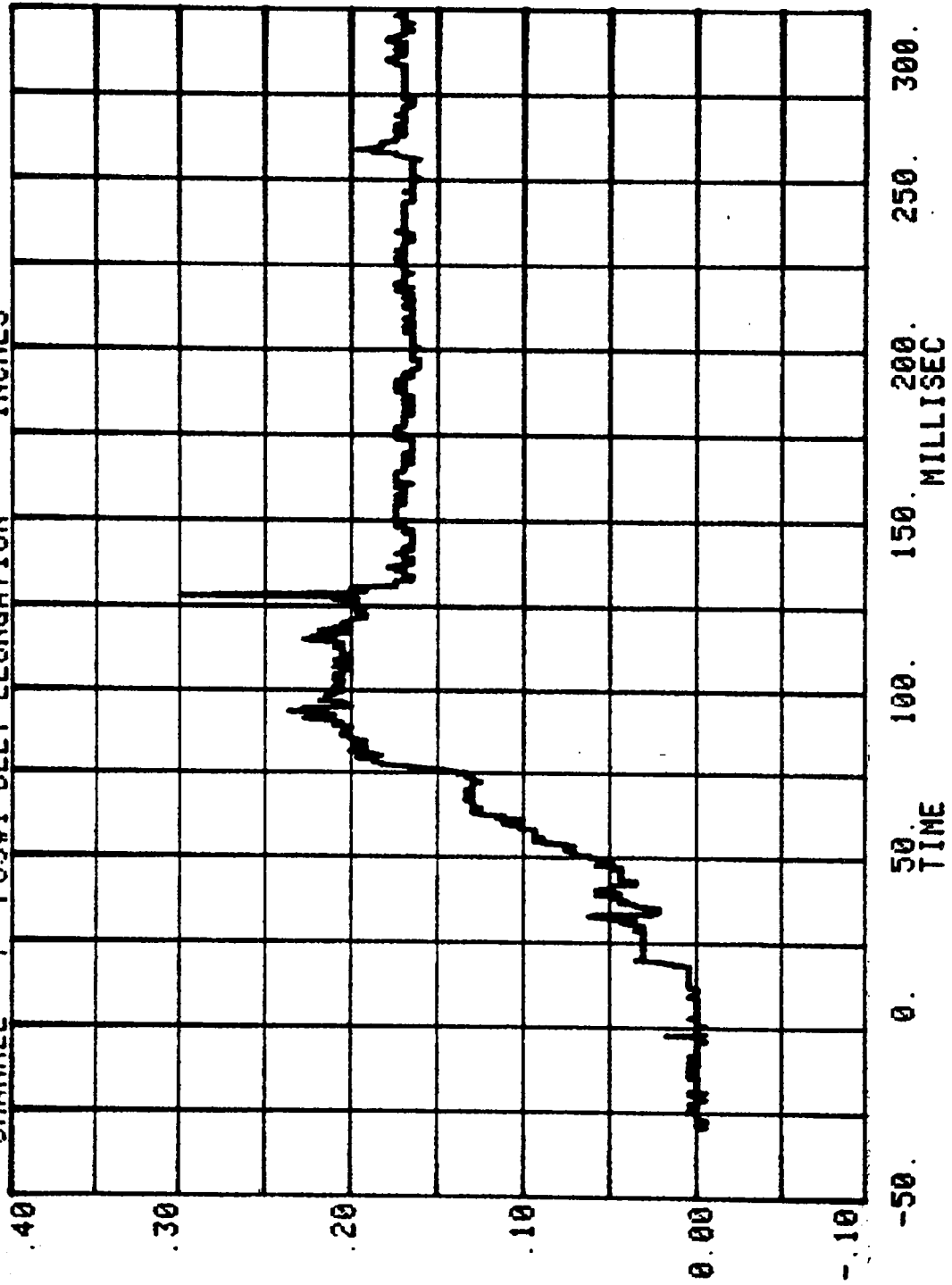




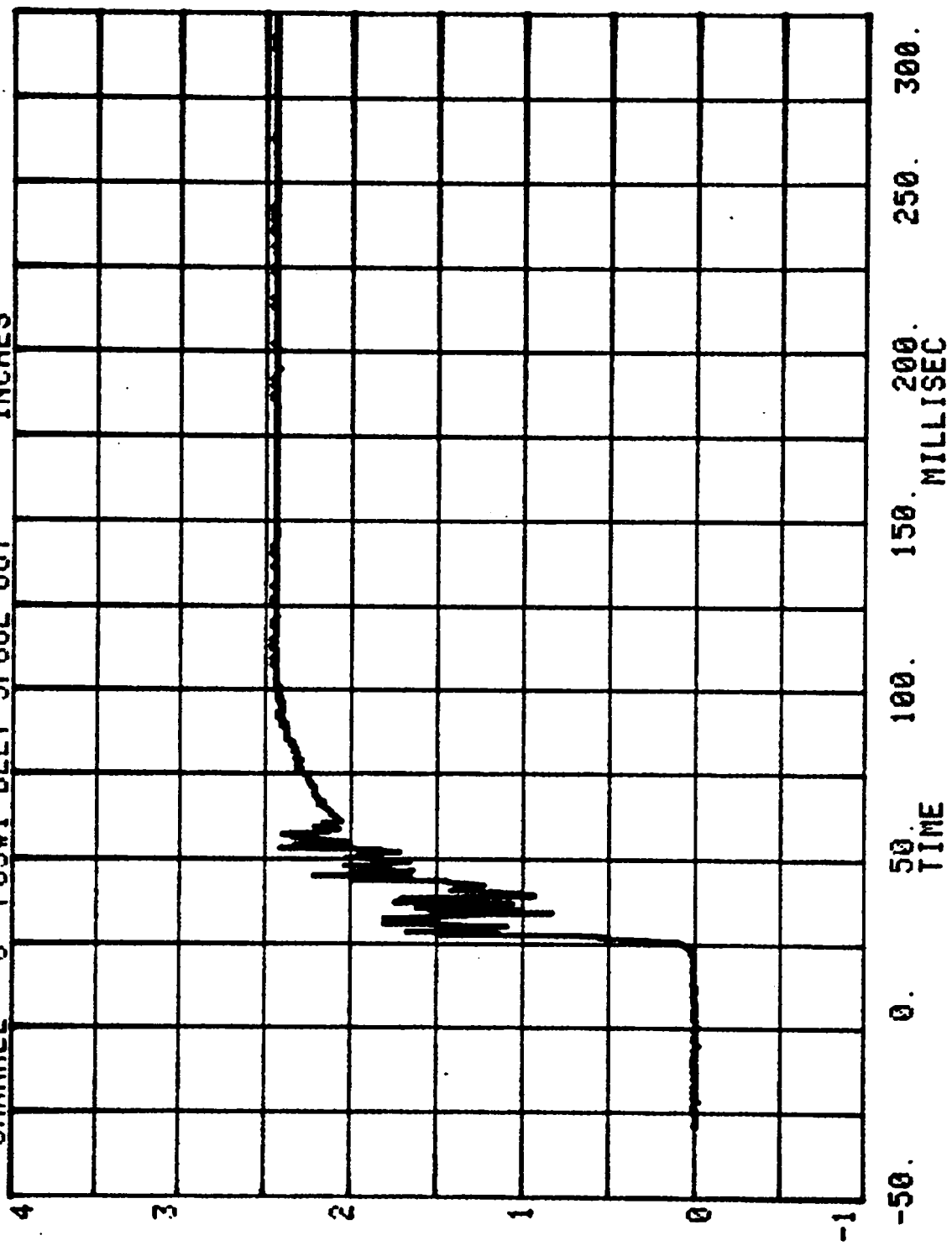
MEASURED OVER 3 INCHES

CHANNEL 7 POS#1 BELT ELONGATION INCHES

RUN= 606 SERIES= 301



RUN= 606 SERIES= 301
CHANNEL 8 POS#1 BELT SPOOL OUT INCHES



HEAD INJURY CRITERION
HEAD SEVERITY INDEX

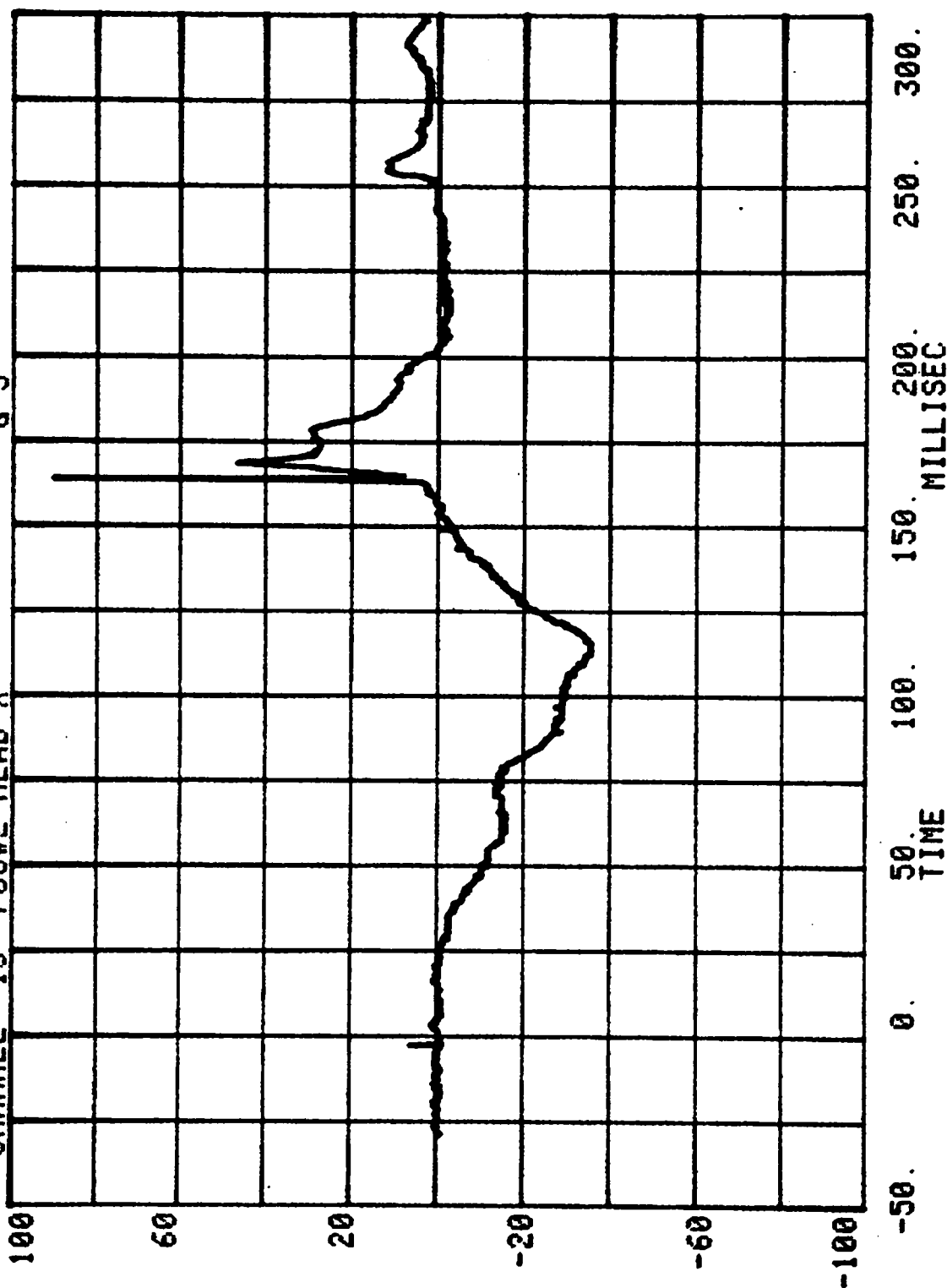
CAR TO LOAD CELL BARRIER

RUN= 606

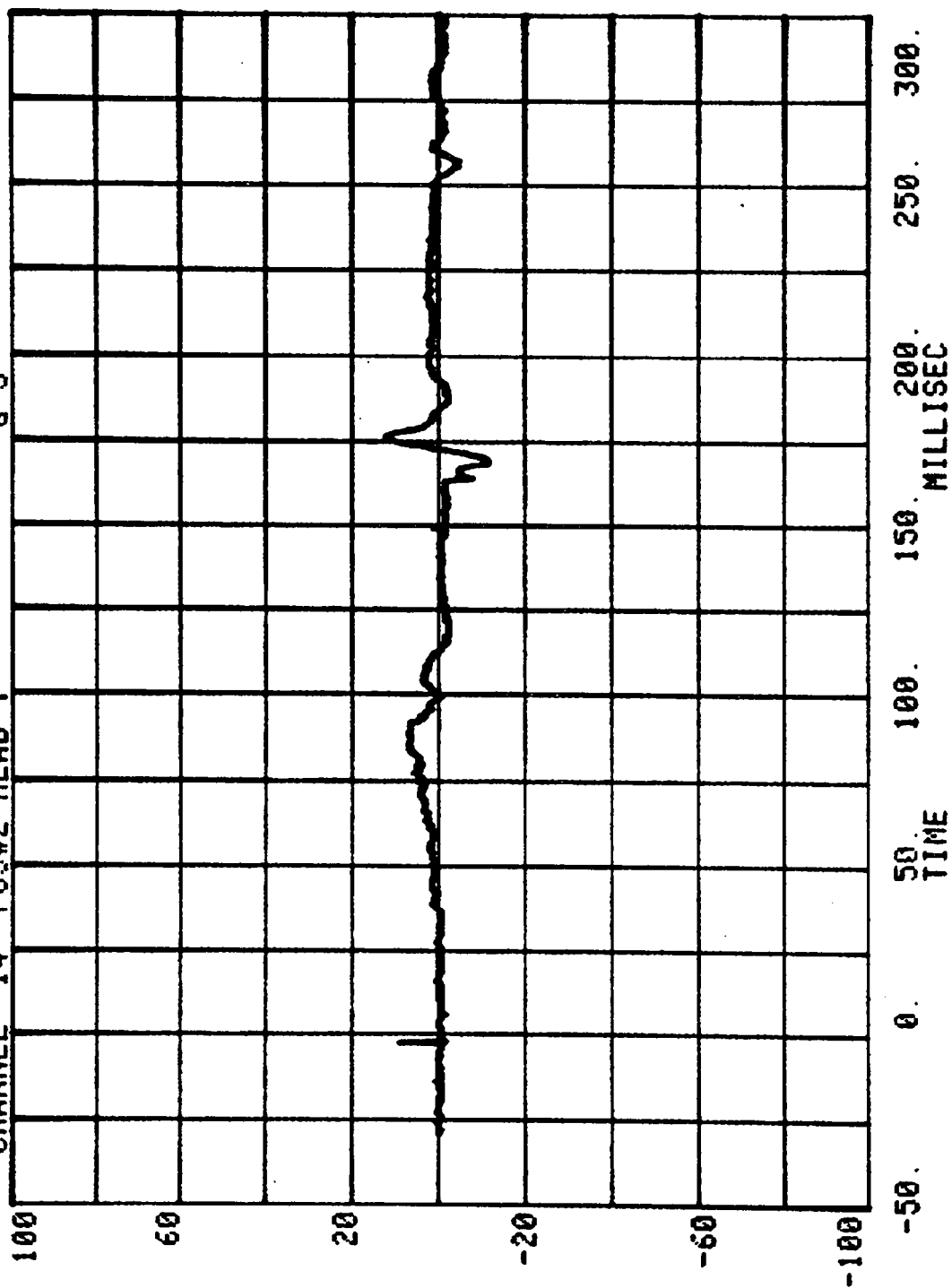
POS#2 HEAD RESULTANT

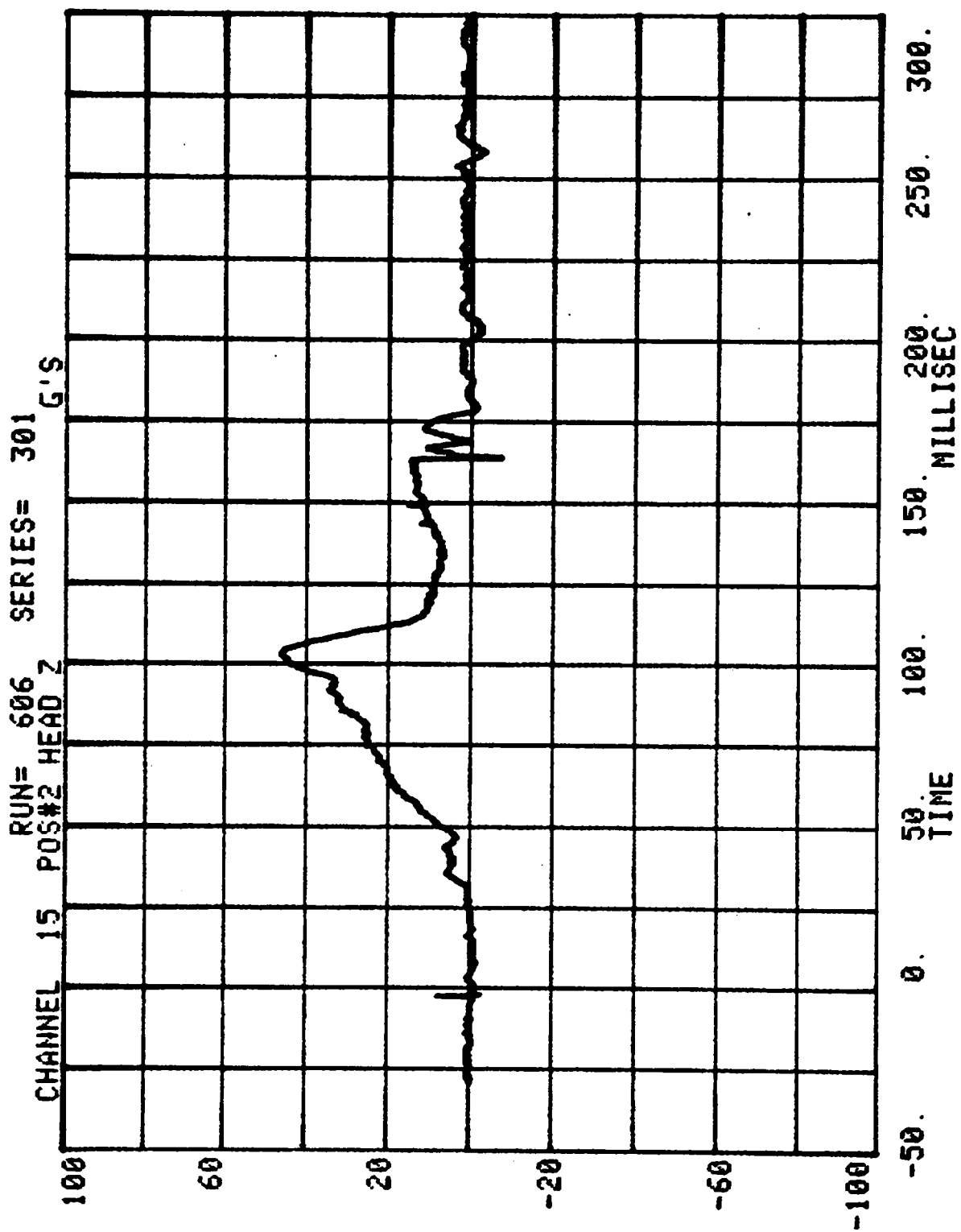
HIC= 566.2 FROM T1= .05535 TO T2= .18300
AVERAGE ACCELERATION BETWEEN T1 AND T2= 28.8G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 805.2

CHANNEL 13 POS#2 HEAD X
RUN= 606 SERIES= 301 G'S



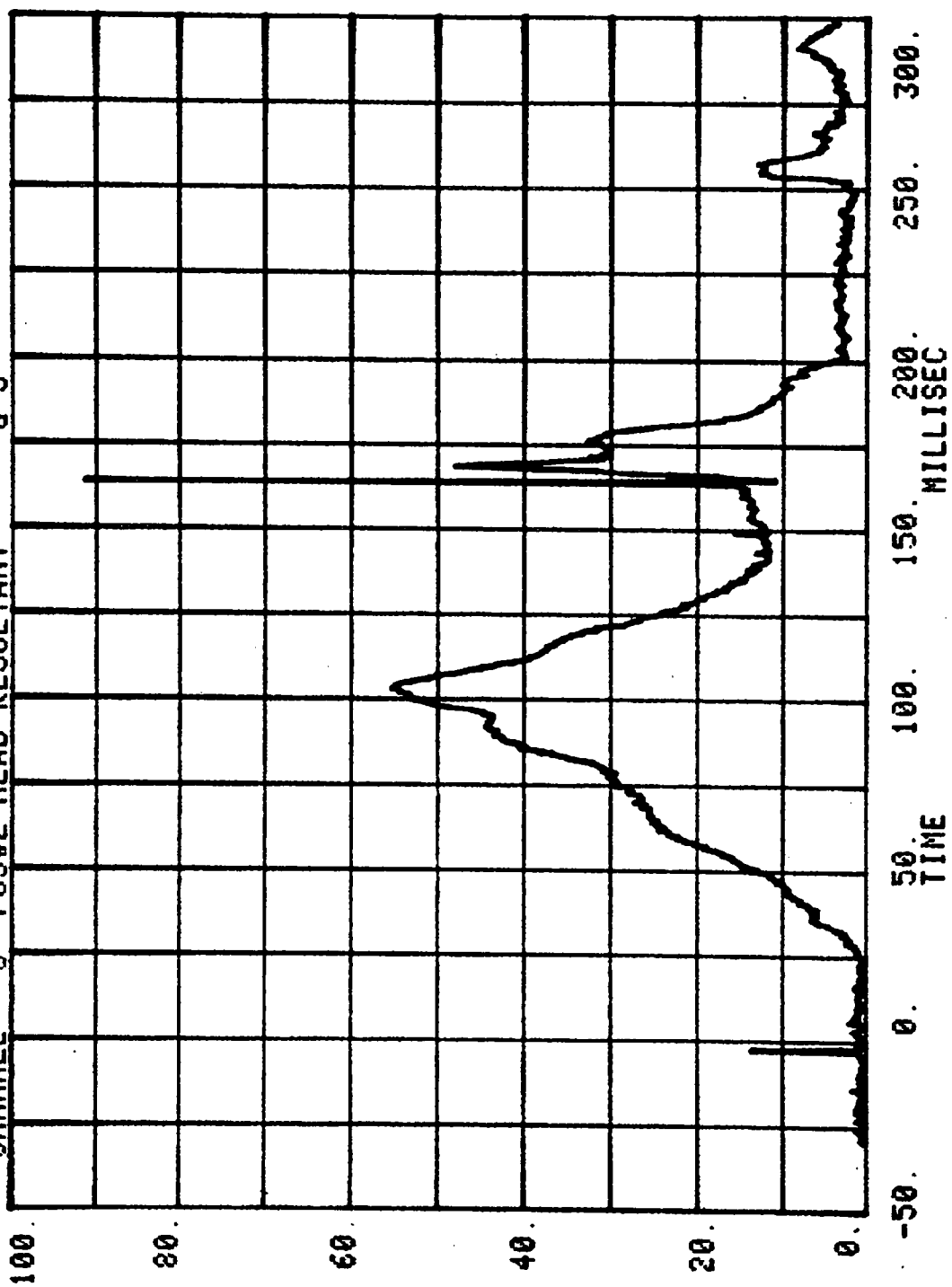
CHANNEL 14 POS#2 HEAD Y RUN= 606 SERIES= 301 G'S



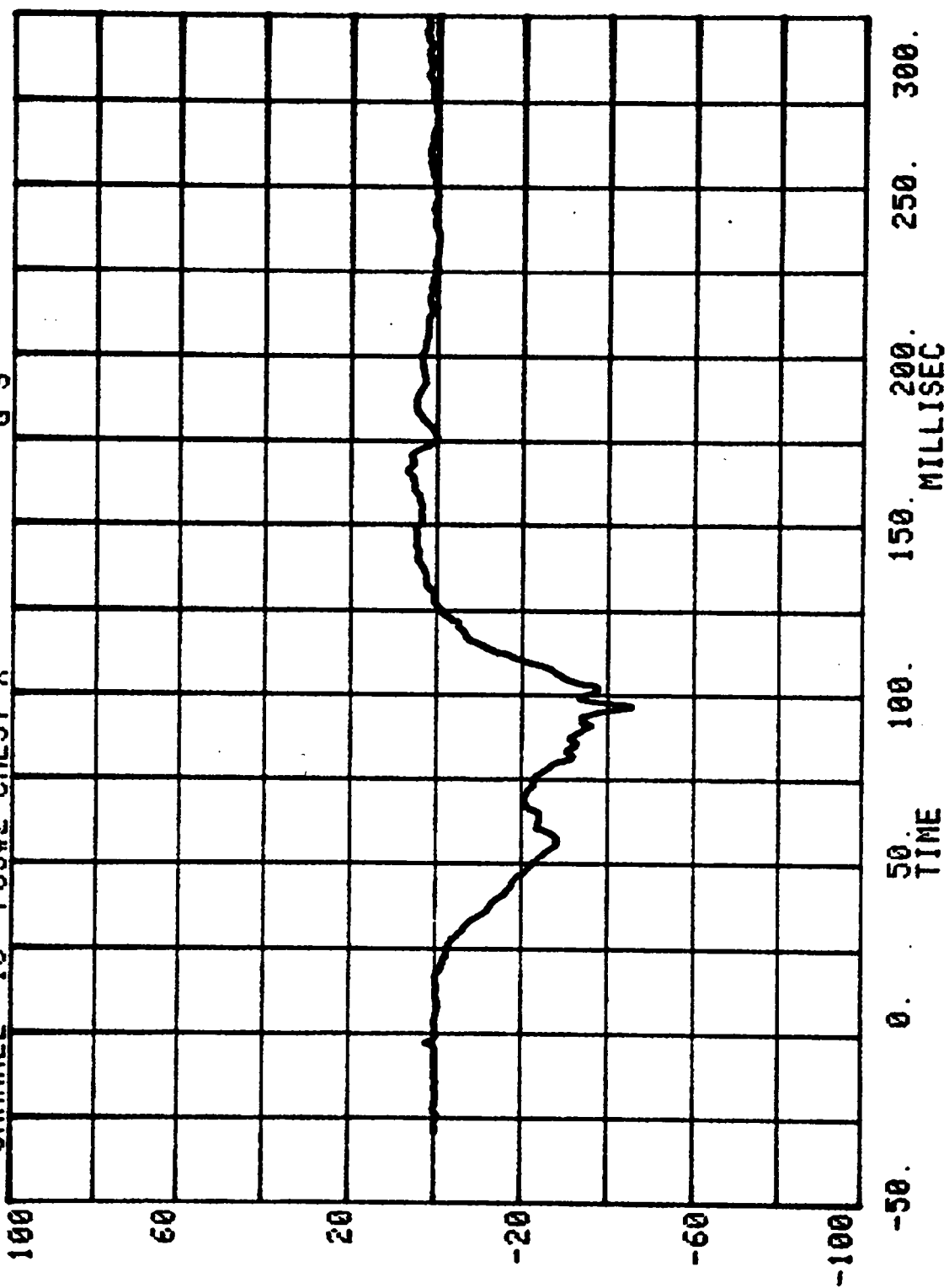


CHANNEL 3 POS#2 HEAD RESULTANT G'S

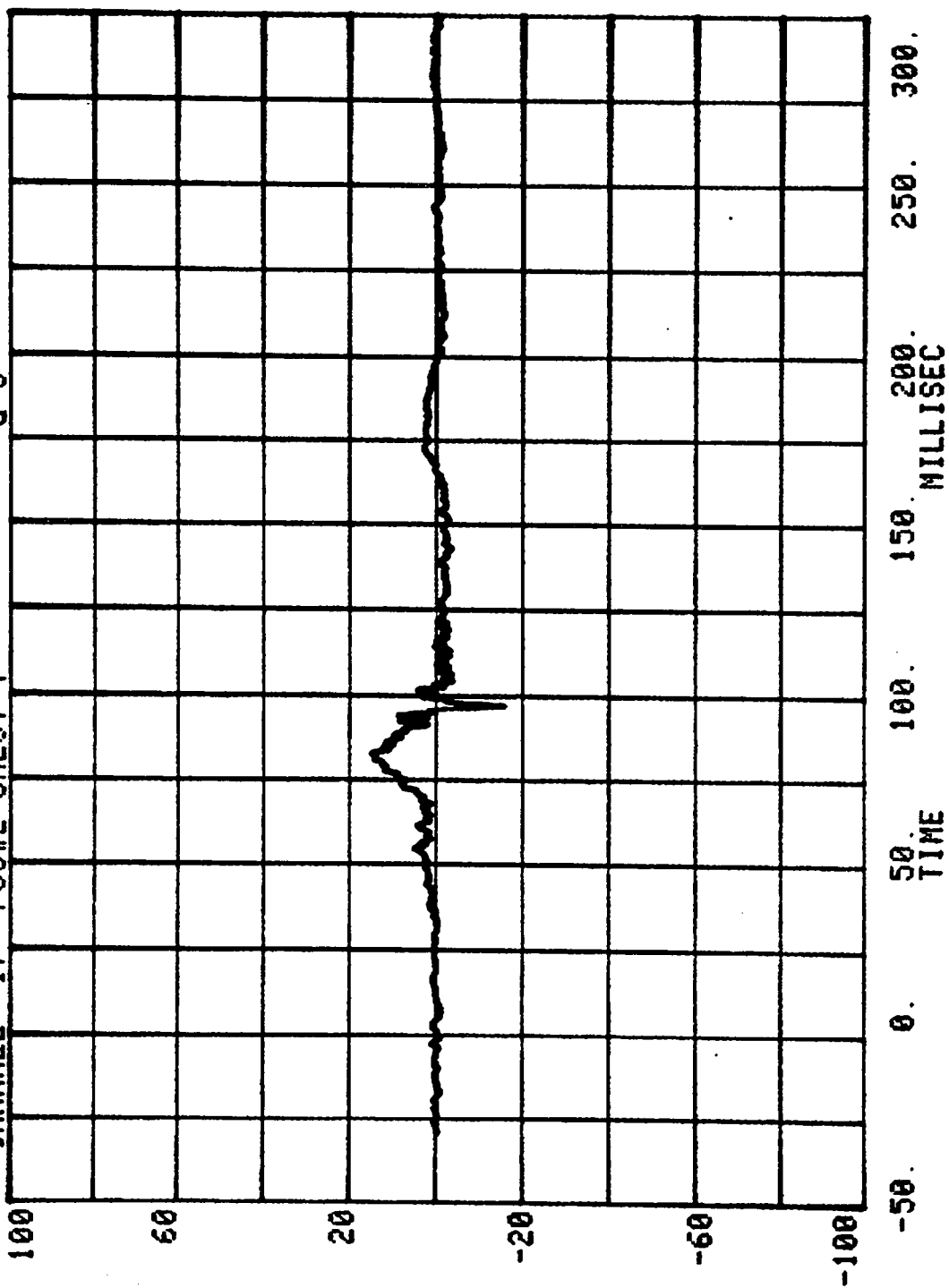
RUN= 606 SERIES= 301



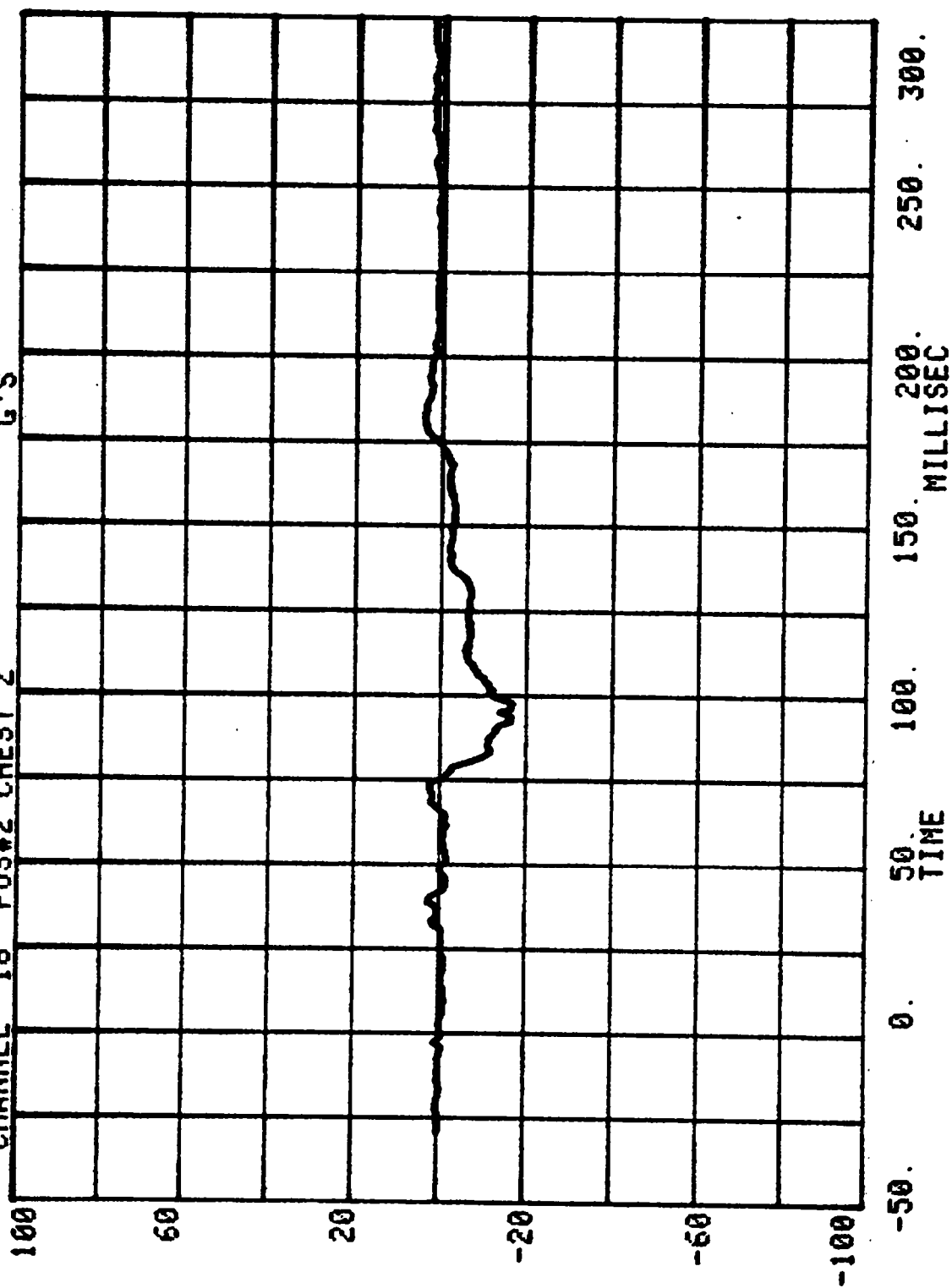
CHANNEL 16 POS#2 CHEST X
RUN= 606 SERIES= 301 G'S



CHANNEL 17 POS#2 CHEST Y RUN= 606 SERIES= 301 G'S

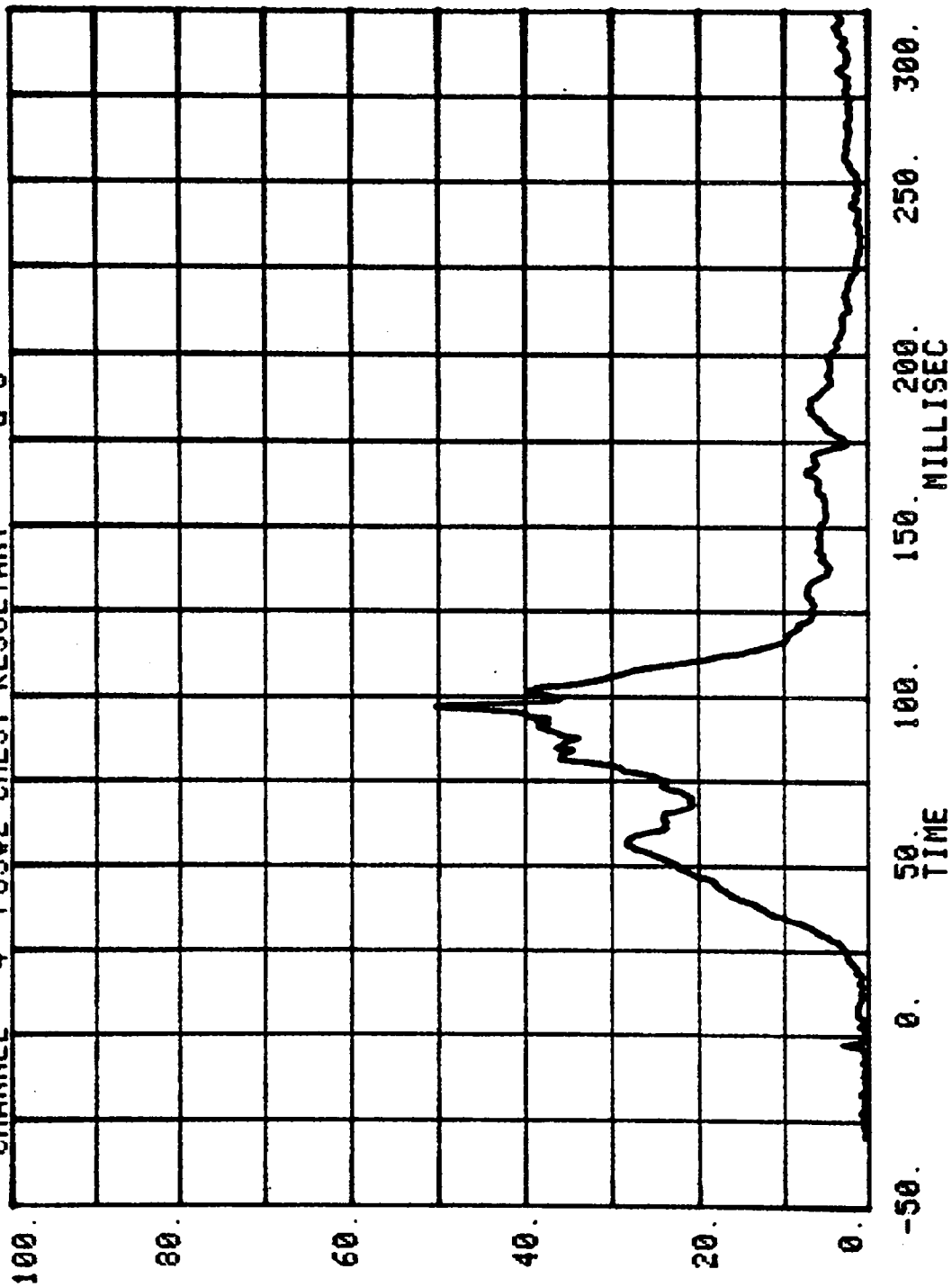


CHANNEL 18 POS#2 CHEST Z RUN= 606 SERIES= 301 G'S

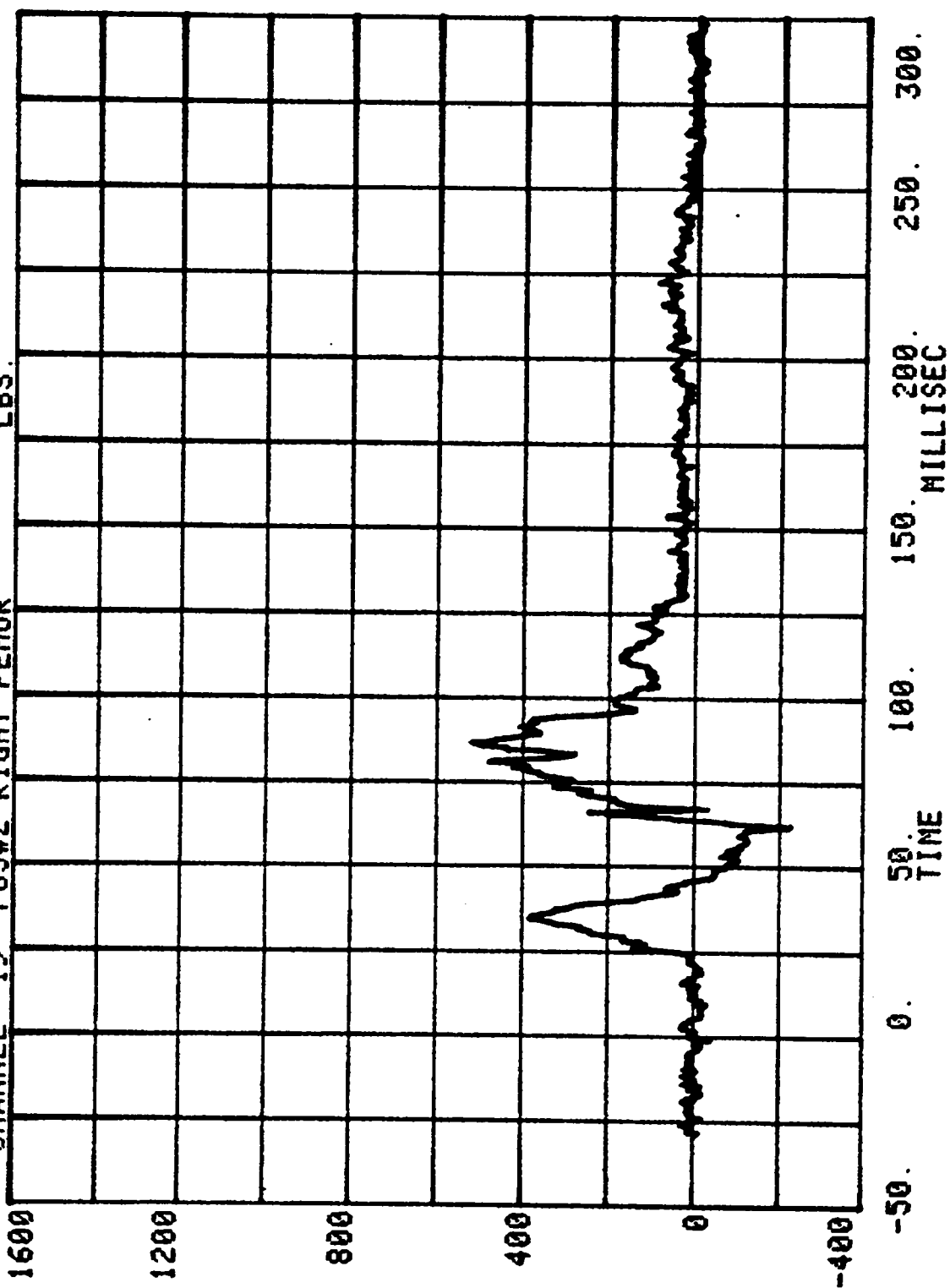


CHANNEL 4 POS#2 CHEST RESULTANT G'S

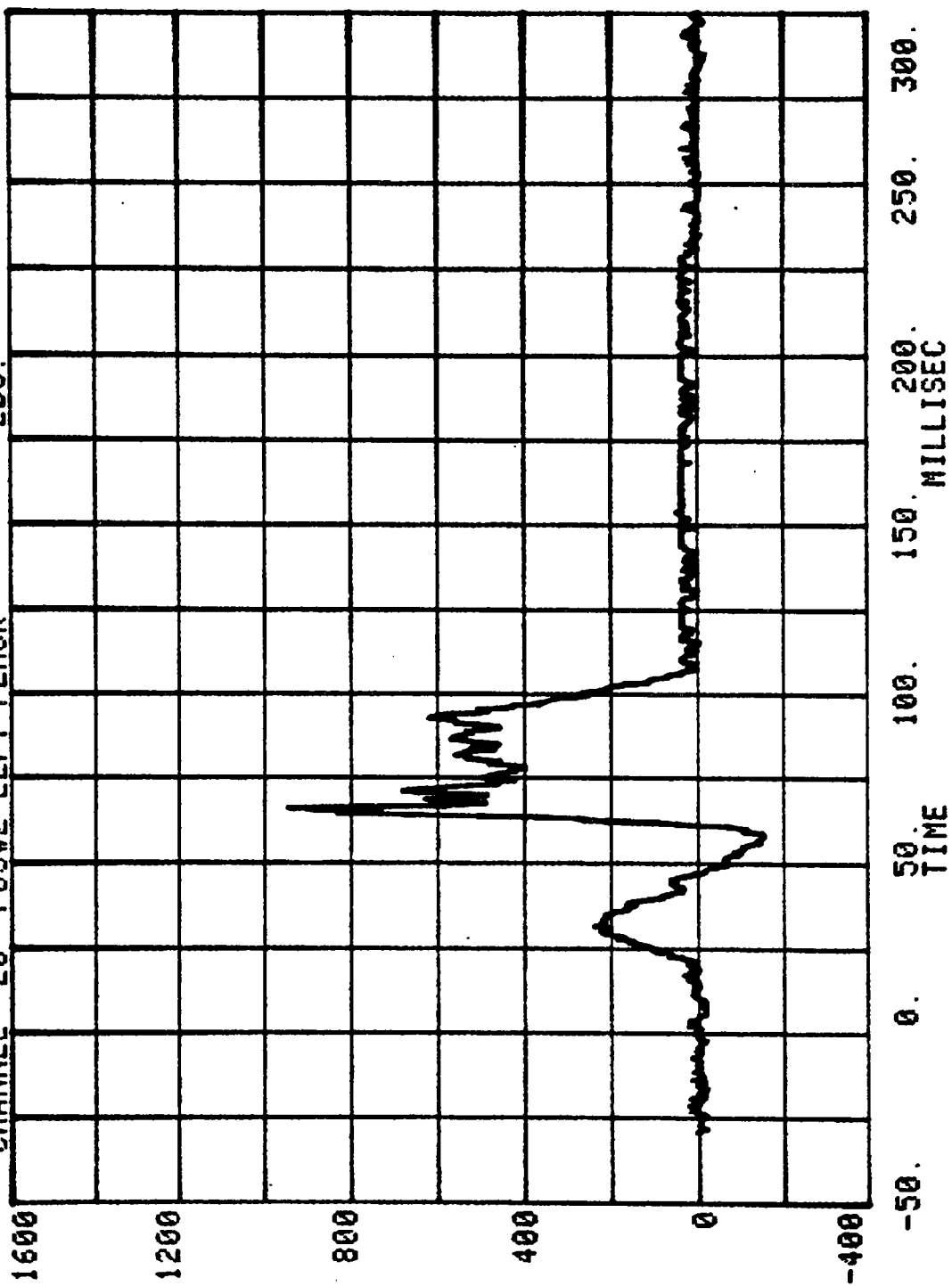
RUN= 606 SERIES= 301



CHANNEL 19 POS#2 RIGHT FEMUR
RUN= 606 SERIES= 301 LBS.

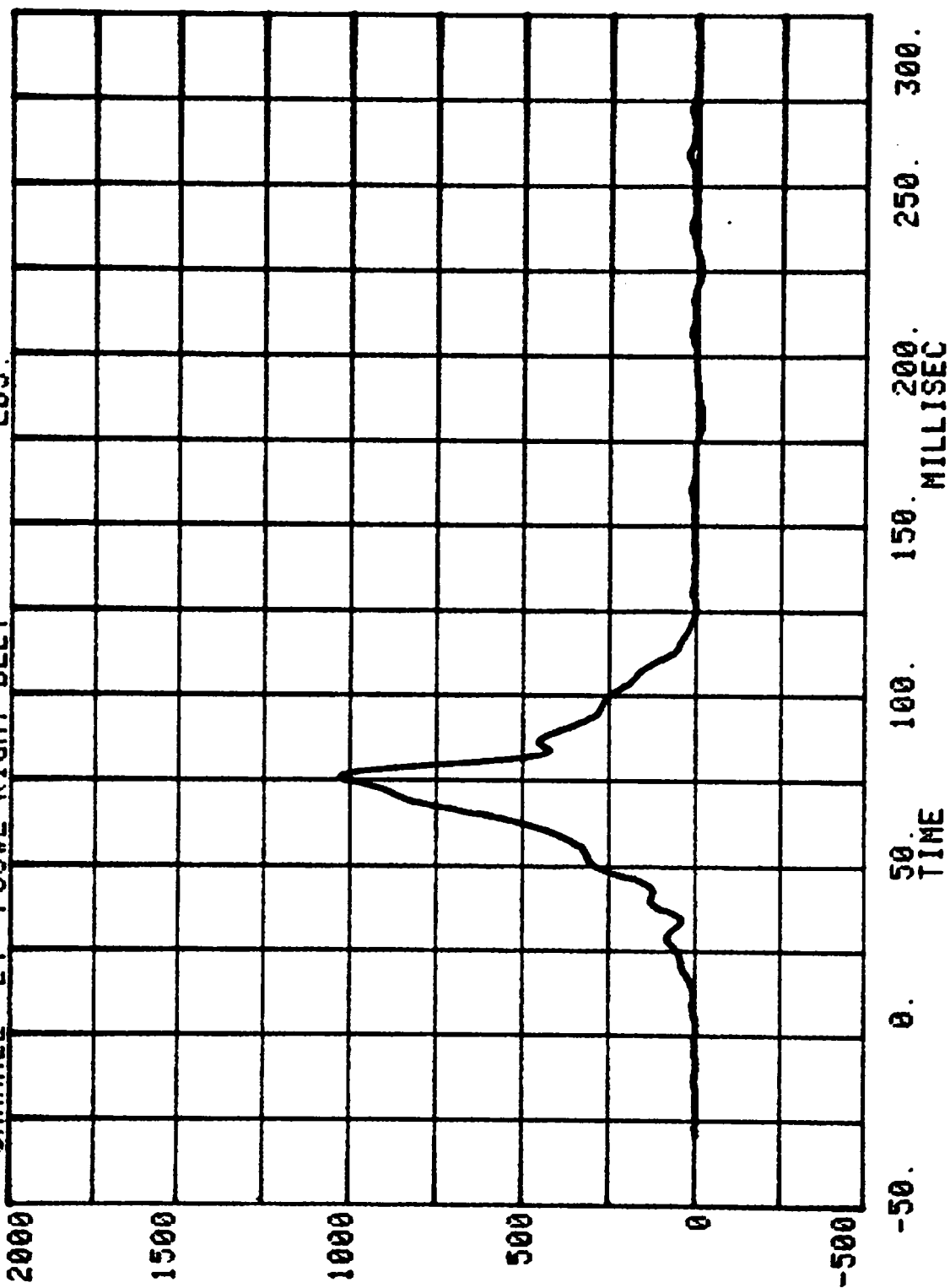


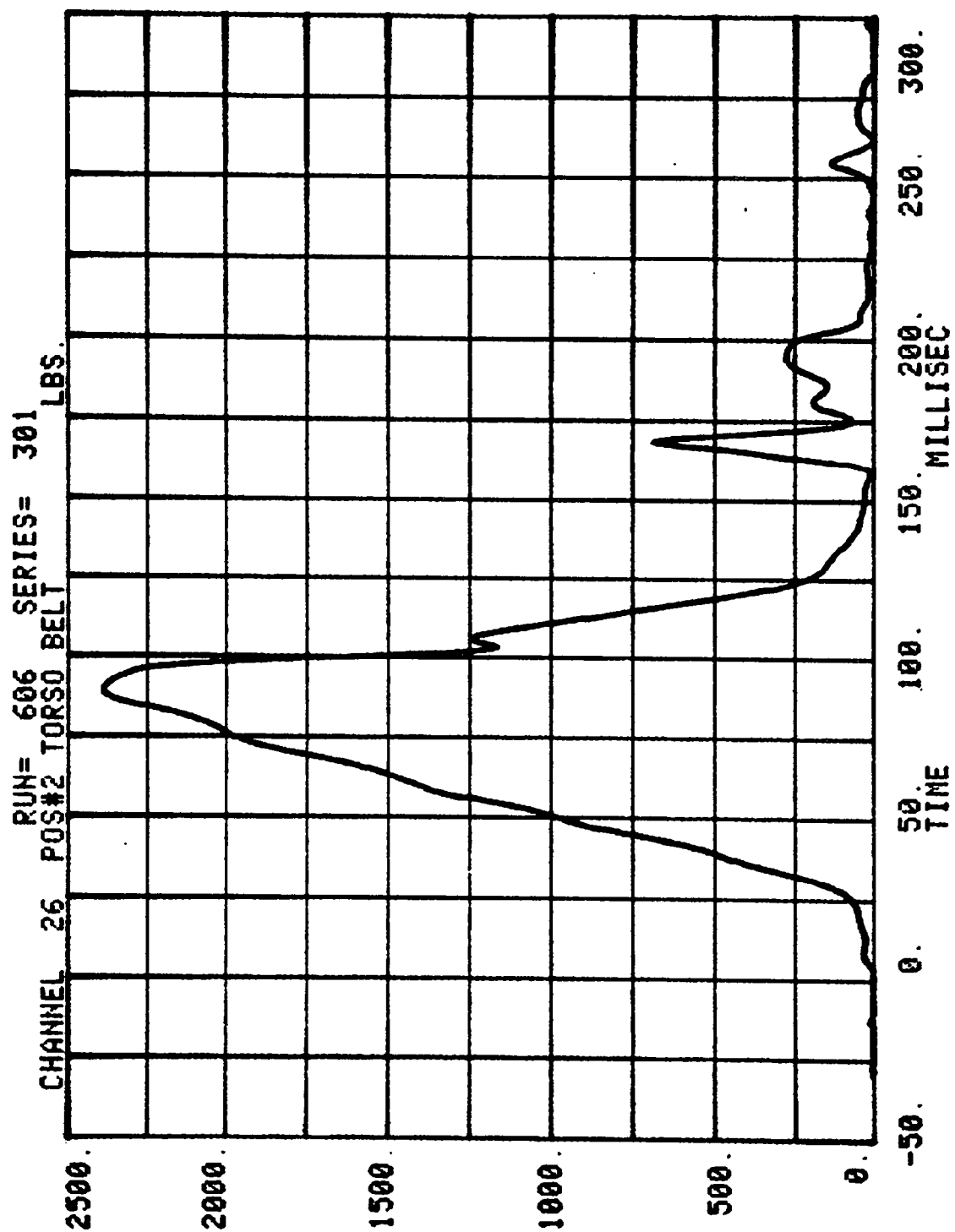
CHANNEL 20 POS#2 LEFT FEMUR
RUN= 606 SERIES= 301 LBS.



CHANNEL 24 POS#2 RIGHT BELT LBS.

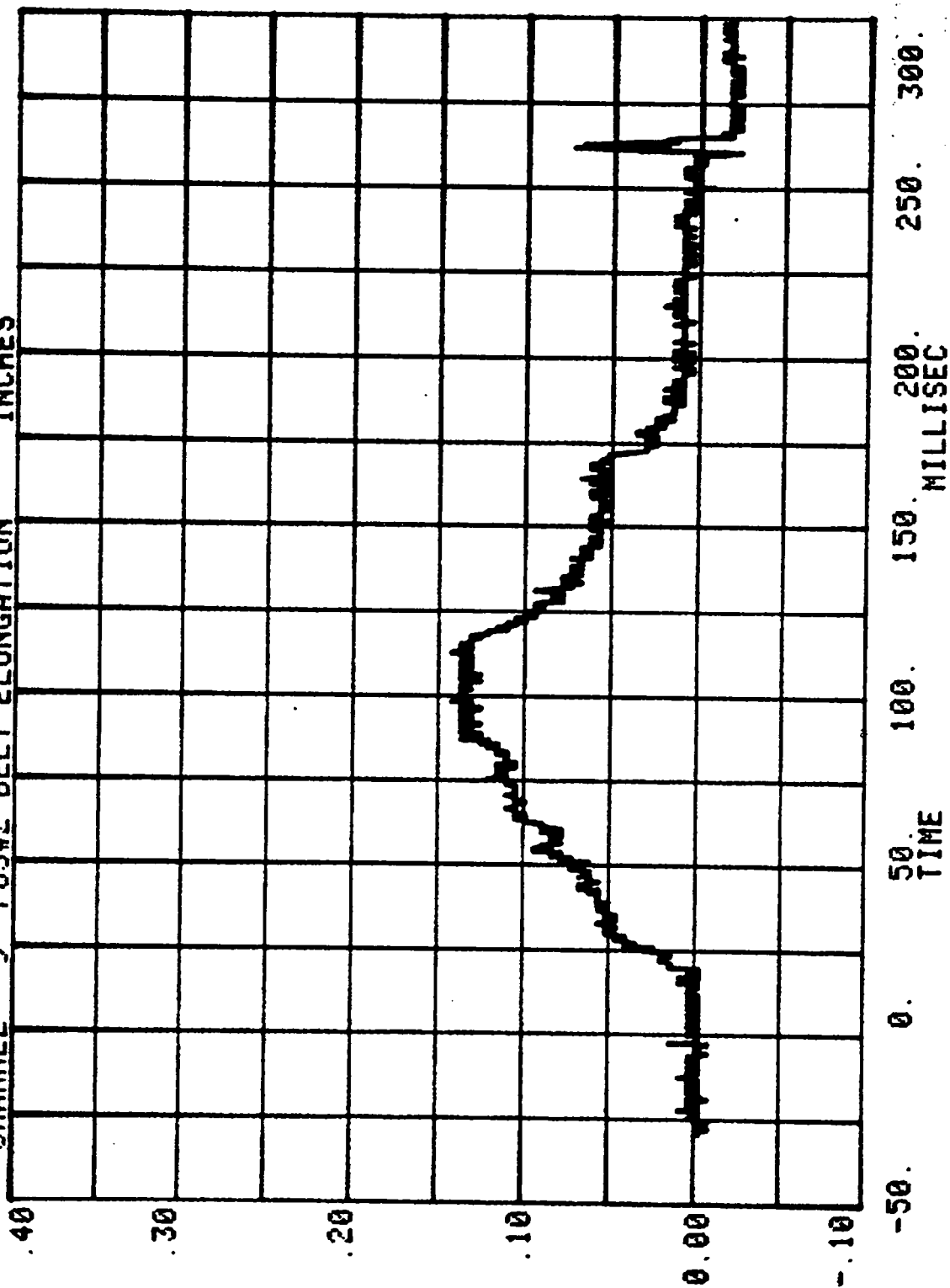
RUN= 606 SERIES= 301



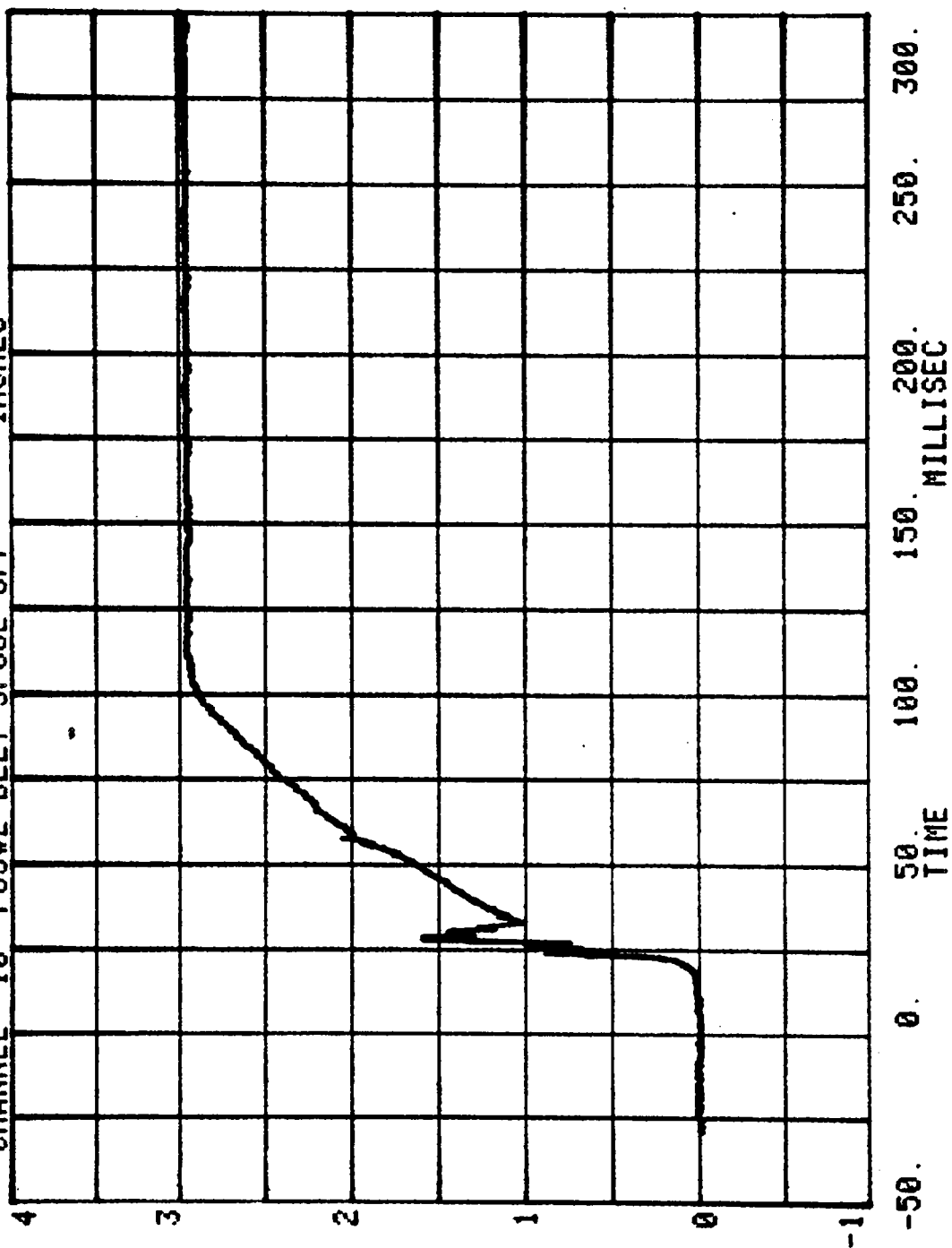


MEASURED OVER 3 INCHES

CHANNEL 9 POS#2 BELT ELONGATION SERIES= 301 INCHES



RUN= 606 SERIES= 301
CHANNEL 10 POS#2 BELT SPOOL OFF INCHES



APPENDIX C
DUMMY CERTIFICATION TESTS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropometric test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation, Advanced Technology Center. A summary of the test results, Part 572 specifications and instrument calibration information is included in this Appendix.

Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
320	11/30/83
749	11/30/83

Electronic Test Equipment

The complement of signal conditioning recording and display equipment in conjunction with dummy certification testing can be found in New Car Assessment and Standards Indicant Testing Final Report, Report No. 6525-V-1.

NHTSA DUMMY ID NO. 320

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: *James J. Hughes*

	Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -	11/28/83 - 11/30/83	
Calibration Sequential Number for Dummy - - -	18	
Temperature in Lab. (Spec. = 66 to 78°F) - - -	68° - 70°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -	36% - 38%	

TEST PARAMETER	SPECIFICATION		
1. <u>HEAD DROP TEST:</u>			
a. Peak Resultant Accel. -	210 to 260G	225 g	
b. Peak Lateral Accel. - -	≤10G	5 g	
c. Time above 100G - - -	0.9 to 1.5 ms	1.2 ms.	
2. <u>NECK BENDING TEST:</u>			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	22.6 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - -	20 to 24G	23 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	25 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤3 ms	2.8 ms.	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	25.6 ms.	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	7.5 ms.	
g. Pendulum Direction Reversal Time - - - -		112 ms.	
h. Max. Head Rotation - -	63 to 73°	66°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	0 ms.
	Displ.	-.5 to .5 in	0.0 in.
30°	Time	25.6 to 34.4 ms	31 ms.
	Displ.	2.1 to 3.1 in.	3.0 in.
60°	Time	40.3 to 51.7 ms	46 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
Maximum (66°)	Time	53.2 to 66.8 ms	55.5 ms.
	Displ.	5.0 to 6.0 in.	5.3 in.

Continued

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. <u>NECK BENDING TEST</u> <u>Continued</u>			
i. Chordal Displacement:			
Head Rotation Angle --			
60°	Time 67.0 to 83.0 ms	68.5 ms.	
	Displ. 4.3 to 5.3 in.	5.0 in.	
30°	Time 85.4 to 104.6 ms	90 ms.	
	Displ. 2.1 to 3.1 in.	2.6 in.	
0°	Time 101.0 to 123.0 ms	107 ms.	
	Displ. -.5 to 0.5 in.	0.0 in.	
3. <u>ABDOMINAL COMPRESSION TEST:</u> (Preload = 10 pounds)			
a. Force @ 1" - - - - -	50 to 63 lbs.	55 lbs.	
b. Force @ 1.3" - - - - -	73 to 88 lbs.	87 lbs.	
4. <u>LUMBAR FLEXION TEST:</u>			
a. Force @ 20° - - - - -	22 to 34 lbs.	33 lbs.	
b. Force @ 30° - - - - -	34 to 46 lbs.	42.5 lbs.	
c. Force @ 40° - - - - -	46 to 58 lbs.	53.5 lbs.	
d. Return Angle - - - - -	12° maximum	6°	
5. <u>CHEST IMPACT TESTS:</u>			
a. High Speed			
(1) Probe Speed - - - - -	21.78-22.22 fps	22.10 fps	
(2) Peak Deflection - - - - -	1.7" maximum	1.68 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	2000 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	51.5%	
b. Low Speed			
(1) Probe Speed - - - - -	13.86-14.14 fps	14.01 fps	
(2) Peak Deflection - - - - -	1.1" maximum	.96 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1220 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	53.9%	

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. <u>KNEE IMPACT TESTS:</u>			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.92 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2200 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.1 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.89 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2000 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.8 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 320

CALIB. SEQ. NOS. FOR DUMMY: 18 &

A. DUMMY INSTRUMENTS:

1. Head Accelerometers--

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

2. Chest Accelerometers-- (Vehicle Crash Test Usage)

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

3. Chest Potentiometer - - -

4. Femur Load Cells--

a. Right Side - - - - -

b. Left Side

B. CALIB. LAB. INSTRUMENTS:

1. Pendulum Accelerometer - -

2. Test Probe Accelerometer -

3. Lumbar Flexion Test Push
Force Gauge - - - - -

4. Abdominal Compression Test
Force Gauge - - - - -

5. Abdominal Compression Test
Displacement Gauge - - - -

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	DB47	7/83	1/84
ENDEVCO	CX05	7/83	1/84
ENDEVCO	CJ54	7/83	1/84
GSE	312	7/83	1/84
GSE	311	7/83	1/84
CEC	22707	7/83	1/84
CEC	22958	7/83	1/84
TRANSDUCER INC	20051	7/83	1/84
BLH	72952	7/83	1/84
CIC	567-11	7/83	1/84

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 749

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: *Savemy Paper*

	Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -	11/28/83 - 11/30/83	
Calibration Sequential Number for Dummy - - - -	4	
Temperature in Lab. (Spec. = 66 to 78°F) - - - -	68° - 70°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -	36% - 38%	

TEST PARAMETER	SPECIFICATION		
1. <u>HEAD DROP TEST:</u>			
a. Peak Resultant Accel. -	210 to 260G	220 g	
b. Peak Lateral Accel. - -	≤10G	9 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.1 ms.	
2. <u>NECK BENDING TEST:</u>			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.2 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	23.5 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	25 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤3 ms	2.8 ms.	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	27.5 ms.	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	5.3 ms.	
g. Pendulum Direction Reversal Time - - - -		109 ms.	
h. Max. Head Rotation - -	63 to 73°	70°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	0 ms.
	Displ.	-.5 to .5 in	0.0 in.
30°	Time	25.6 to 34.4 ms	29.5 ms.
	Displ.	2.1 to 3.1 in.	3.0 in.
60°	Time	40.3 to 51.7 ms	44 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
Maximum (70°)	Time	53.2 to 66.8 ms	54 ms.
	Displ.	5.0 to 6.0 in.	5.1 in.

Continued

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. <u>NECK BENDING TEST</u> <u>Continued</u>				
i. Chordal Displacement:				
Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	67 ms.	
	Displ.	4.3 to 5.3 in.	4.7 in.	
30°	Time	85.4 to 104.6 ms	86.5 in.	
	Displ.	2.1 to 3.1 in.	2.4 in.	
0°	Time	101.0 to 123.0 ms	101 ms.	
	Displ.	-.5 to 0.5 in.	+0.2 in.	
3. <u>ABDOMINAL COMPRESSION TEST:</u>				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	54 lbs.	
b. Force @ 1.3" - - - - -		73 to 88 lbs.	78 lbs.	
4. <u>LUMBAR FLEXION TEST:</u>				
a. Force @ 20° - - - - -		22 to 34 lbs.	33.5 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	45.0 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	52.5 lbs.	
d. Return Angle - - - - -		12° maximum	8°	
5. <u>CHEST IMPACT TESTS:</u>				
a. High Speed				
(1) Probe Speed - - - - -		21.78-22.22 fps	21.89 fps	
(2) Peak Deflection - - - - -		1.7" maximum	1.42 in.	
(3) Peak Resistive Force - - - - -		2250 lbs. maximum	2070 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	51.8%	
b. Low Speed				
(1) Probe Speed - - - - -		13.86-14.14 fps	13.97 fps	
(2) Peak Deflection - - - - -		1.1" maximum	.94 in.	
(3) Peak Resistive Force - - - - -		1450 lbs. maximum	1295 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	51.9%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 749

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. <u>KNEE IMPACT TESTS:</u>			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.98 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2400 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.8 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.92 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2250 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.75 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 749

CALIB. SEQ. NOS. FOR DUMMY: 4 &

A. DUMMY INSTRUMENTS:

1. Head Accelerometers--

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

2. Chest Accelerometers-- (Vehicle Crash Test Usage)

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

3. Chest Potentiometer - - -

4. Femur Load Cells--

a. Right Side - - - - -

b. Left Side

B. CALIB. LAB. INSTRUMENTS:

1. Pendulum Accelerometer - -

2. Test Probe Accelerometer -

3. Lumbar Flexion Test Push
Force Gauge - - - - -

4. Abdominal Compression Test
Force Gauge - - - - -

5. Abdominal Compression Test
Displacement Gauge - - - -

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
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ENDEVCO	CX05	7/83	1/84
ENDEVCO	CJ54	7/83	1/84
GSE	312	7/83	1/84
GSE	311	7/83	1/84
CEC	22707	7/83	1/84
CEC	22958	7/83	1/84
TRANSDUCER INC	20051	7/83	1/84
BLH	72952	7/83	1/84
CIC	567-11	7/83	1/84